

Hunters Point Naval Shipyard, Parcel G, RSY Data Report

Contract No. N62473-17-D-006 CTO 5065 RSY Pad Data Report							
RSY Pad: RSY 20 Lift 1	Soil Origin: TU-098A ESU						
Data attached and submitted by: Amy Mangel	Data Report Submittal Date: 08/20/2021						

Systematic Soil Sample Data: RSY 20 Lift 1							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading ¹ (CPM)	Gamma Static 3x3 Nal Reading ² (CPM)	Gamma 3x3 Static Investigation Level ³ (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	Total Sr Final Analytical Results (pCi/g)
		Project Remediation Goals*				1.861	0.141
HPPG-ESU-TU098A-001	1	Systematic	9,851	9,372	16,729	-0.110	0.0259
HPPG-ESU-TU098A-002	2	Systematic	10,801	10,825	16,729	0.532	0.0258
HPPG-ESU-TU098A-003	3	Systematic	10,221	9,773	16,729	0.214	0.0184
HPPG-ESU-TU098A-004	4	Systematic	11,086	10,904	16,729	0.369	-0.0352
HPPG-ESU-TU098A-005	5	Systematic	10,588	9,666	16,729	0.334	0.0228
HPPG-ESU-TU098A-006	6	Systematic	9,953	9,463	16,729	0.0997	-0.045
HPPG-ESU-TU098A-007	7	Systematic	9,899	9,572	16,729	0.296	-0.0113
HPPG-ESU-TU098A-008	8	Systematic	10,154	10,798	16,729	0.314	0.0281
HPPG-ESU-TU098A-009	9	Systematic	9,875	9,760	16,729	0.378	-0.0479
HPPG-ESU-TU098A-010	10	Systematic	12,015	11,228	16,729	0.618	-0.0323
HPPG-ESU-TU098A-011	11	Systematic	11,065	10,076	16,729	0.343	0.0135
HPPG-ESU-TU098A-012	12	Systematic	10,533	10,214	16,729	0.307	0.0184
HPPG-ESU-TU098A-013	13	Systematic	9,597	9,867	16,729	0.302	0.0130
HPPG-ESU-TU098A-014	14	Systematic	10,809	12,215	16,729	0.464	0.0246
HPPG-ESU-TU098A-015	15	Systematic	11,791	11,721	16,729	0.509	0.0430
HPPG-ESU-TU098A-016	16	Systematic	11,252	11,016	16,729	0.567	0.0342
HPPG-ESU-TU098A-017	17	Systematic	10,620	11,412	16,729	0.562	-0.0102
HPPG-ESU-TU098A-018	18	Systematic	10,484	10,492	16,729	0.314	0.0286
HPPG-ESU-TU098A-019	19	Systematic	10,825	10,199	16,729	0.325	0.0237
HPPG-ESU-TU098A-020	20	Systematic	11,718	10,781	16,729	0.479	-0.00208
HPPG-ESU-TU098A-021	21	Systematic	11,164	10,919	16,729	0.491	0.0120
HPPG-ESU-TU098A-022	22	Systematic	10,479	9,724	16,729	0.380	0.0180
HPPG-ESU-TU098A-023	23	Systematic	11,139	10,352	16,729	0.295	0.0282
HPPG-ESU-TU098A-024	24	Systematic	10,637	10,350	16,729	0.484	-0.0582
HPPG-ESU-TU098A-025	25	Systematic	10,811	10,781	16,729	0.533	-0.0240
Soil Systematic Sample Statistics						²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)
						Maximum	0.618
						Mean	0.376
						Median	0.369
						Minimum	-0.110
						Standard Deviation	0.160
							N/A

Note 1: Gamma static measurements collected on 09/28/2020 with 3x3 #176952

Note 2: Gamma static measurements collected on 07/27/2021 with 3x3 #117336

Note 3: Gamma static IL pertains to 3x3 #117336

Biased Soil Sample Data: RSY 20 Lift 1							
Sample Identification	Sample Location	Type of Sample	Gamma Static 3x3 Nal Reading (CPM)	Gamma 3x3 Static Investigation Level (CPM)	²²⁶ Ra Final Analytical Results (pCi/g)	¹³⁷ Cs Final Analytical Results (pCi/g)	Total Sr Final Analytical Results (pCi/g)
		Project Remediation Goals*			1.861	0.141	0.331
HPPG-ESU-TU098A-B-001	1	Biased	11,957	15,658	0.455	0.00820	0.0734

CPM Counts per minute

pCi/g Picocuries per gram

* Note: Project Remediation goal (RG) is the Record of Decision RG or Offsite RBA value, whichever is higher

Instrument and Survey Summary					
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #
Gamma Walkover Survey	HPRS-09252020-PG-ROV-121	09/25/2020	RS-700	03/31/2022	5447/5448
Follow-Up Static Survey	HPRS-09282020-PG-JSS-124	09/28/2020	RS-700	03/31/2022	5447/5448
Systematic Sample Survey	HPRS-09282020-PG-JSS-123	09/28/2020	3x3	08/06/2021	176952
Systematic Sample Resurvey	HPRS-07272021-PG-JSS-941	07/27/2021	3x3	05/12/2022	117336
Biased Sample Survey	HPRS-09292020-PG-JSS-125	09/29/2020	3x3	08/06/2021	108853

Region of Interest (ROI) Summary	
ROI	Nuclide and Energy
ROI 3	Ra-226 (1764 keV)
ROI 6	Ra-226 (609 keV)
ROI 7	Cs-137 (662 keV)
ROI 8	Ra-226 (251 keV)
ROI 10	Gross Gamma

Summary: RSY 20 Lift 1
1) Gamma walkover survey and data review—upon review of initial RS-700 scan data in accordance with Final Parcel G Work Plan Section 3.5.1.1, 32 follow-up static investigations were required. Gamma scan data summary statistics, normal Q-Q plots, histograms, and box plots are provided on pages 3-6. Contour maps of the scan data for the ROIs of interest are presented on page 7. The RSY scan data was lower than the background scan data.
2) One-minute static follow-up measurements with the RS-700 were collected at 32 gamma walkover investigation locations in accordance with Final Parcel G Work Plan Section 3.3.1. A map of the follow-up locations is presented on page 8. The net follow-up static spectra are presented on pages 14-45.
3) In accordance with Final Parcel G Work Plan Section 3.4.1, twenty-five systematic soil samples (001-025) were obtained and submitted for gamma spectroscopy analysis. Sample locations are shown on the Systematic Sample Survey map (page 9). TestAmerica sample results are attached (pages 46-83; 99-121). Ten percent of the systematic soil samples (three samples in total -001, -011, & -021) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 46-83; 99-121). After the systematic samples were analyzed, it was found that several of the samples (-008, -012, -013, -014, -015, -016, -017, -021, -022, -023, -024, and -025) did not have a sufficient volume of soil for proper gamma spectroscopy analysis (see note on page 50). New soil samples were collected from the affected sample locations on the RSY pad and submitted for gamma spectroscopy analysis. Sample results reported on page 1 for the affected samples are the final results from the resample (pages 99-121). The initial total strontium result for sample -021 is presented, as the total strontium analysis method was not affected by the insufficient amount of sample for gamma spectroscopy. Static 3x3 NaI gamma measurements were collected during the initial systematic sampling event (09/28/2020), however a static soil IL was not developed for the specific instrument prior to it being sent offsite shortly after use. Static 3x3 NaI gamma measurements were then re-collected at all 25 systematic sample locations during the systematic resample event (07/27/2021), with an instrument that did have a soil static IL developed. Systematic sample histograms, box plots, Q-Q plots, and power curves are provided on pages 11-12. All sample results were below the applicable RGs. The number of samples collected was sufficient to meet project DQOs.
4) In accordance with Final Parcel G Work Plan Section 3.3.1, one biased sample was collected from the location of the highest gross gamma scan measurement, since all follow-up static measurements were below the ROC-specific critical levels. TestAmerica sample results are attached (pages 84-98). A map of the biased sample location is presented on page 10. Biased sample results were all below the applicable RGs.
Conclusions: In accordance with the DQOs in Section 3.1 of the Final Parcel G Work Plan, final analytical results for all samples from the RSY pad were shown by a point by point comparison to meet the RGs. Graphical comparisons demonstrated that ROC concentrations were consistent with background. RSY 20 Lift 1 contains soil from Hunters Point Naval Shipyard Parcel G Phase 1 excavation TU-098A ESU. APTIM requests RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be used as backfill for TU-098.

Soil Scan Statistics

Statistical Summary

PG-RSY-20-U1					
Dataset	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)
	ROI-03	2.00	28.06	12.25	12.03
	ROI-06	54.13	133.30	87.58	87.17
	ROI-07	37.08	104.22	67.66	67.15
	ROI-08	73.16	164.36	110.17	110.21
	ROI-10	1,880.70	2,772.15	2,266.91	2,250.77
					153.29

Statistical Summary Reference Background

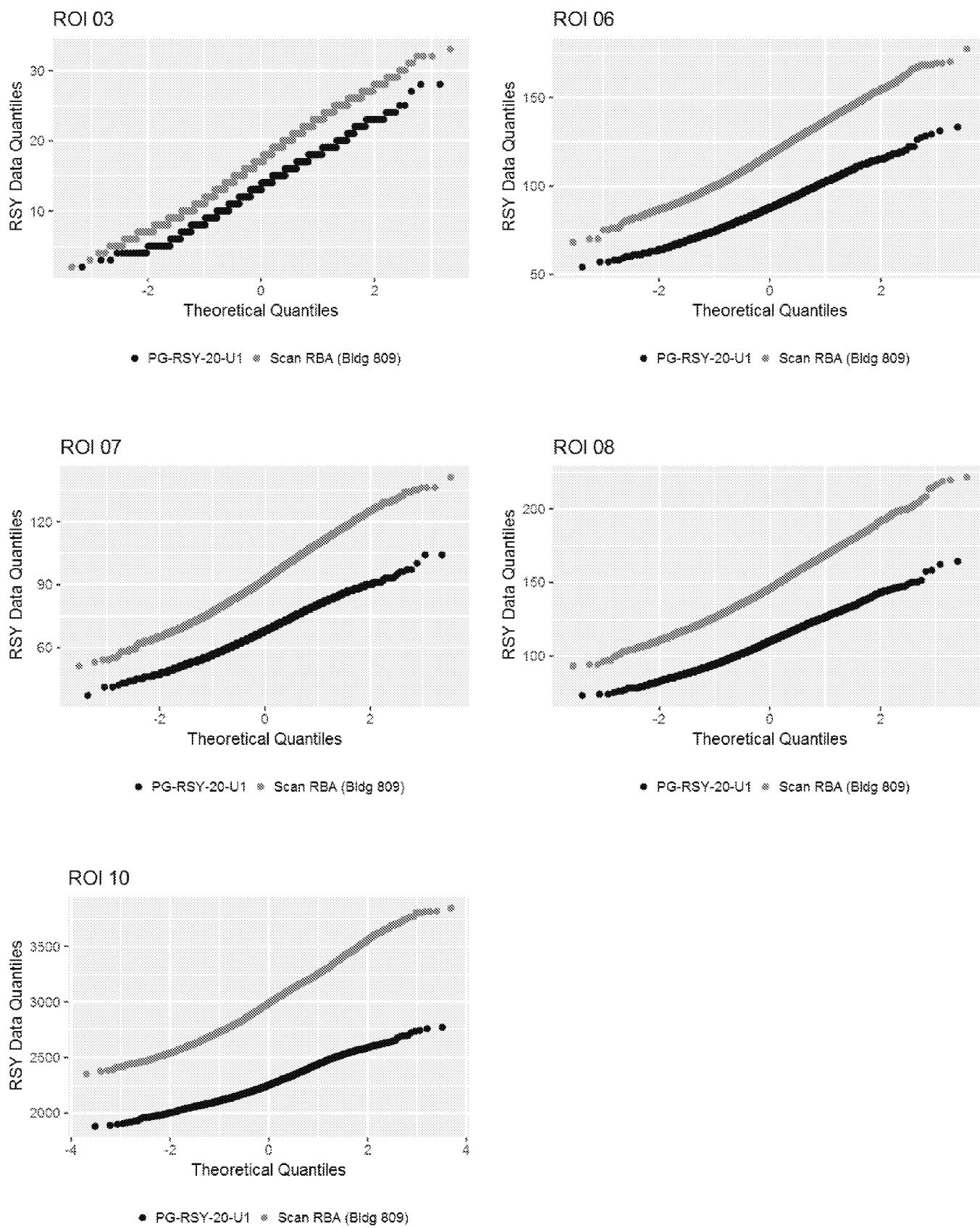
Scan RBA (Bldg 809)					
TYPE	ROI	Minimum (cps)	Maximum (cps)	Mean (cps)	Median (cps)
	ROI-03	2.00	33.08	16.21	16.04
	ROI-06	68.15	177.45	117.58	117.26
	ROI-07	51.11	141.33	92.34	91.24
	ROI-08	93.19	221.48	146.24	145.30
	ROI-10	2,354.11	3,845.31	2,995.57	2,989.64
					255.66

cps = counts per second

Dataset	Number of Data Points
PG-RSY-20-U1	2414
Scan RBA (Bldg 809)	4705

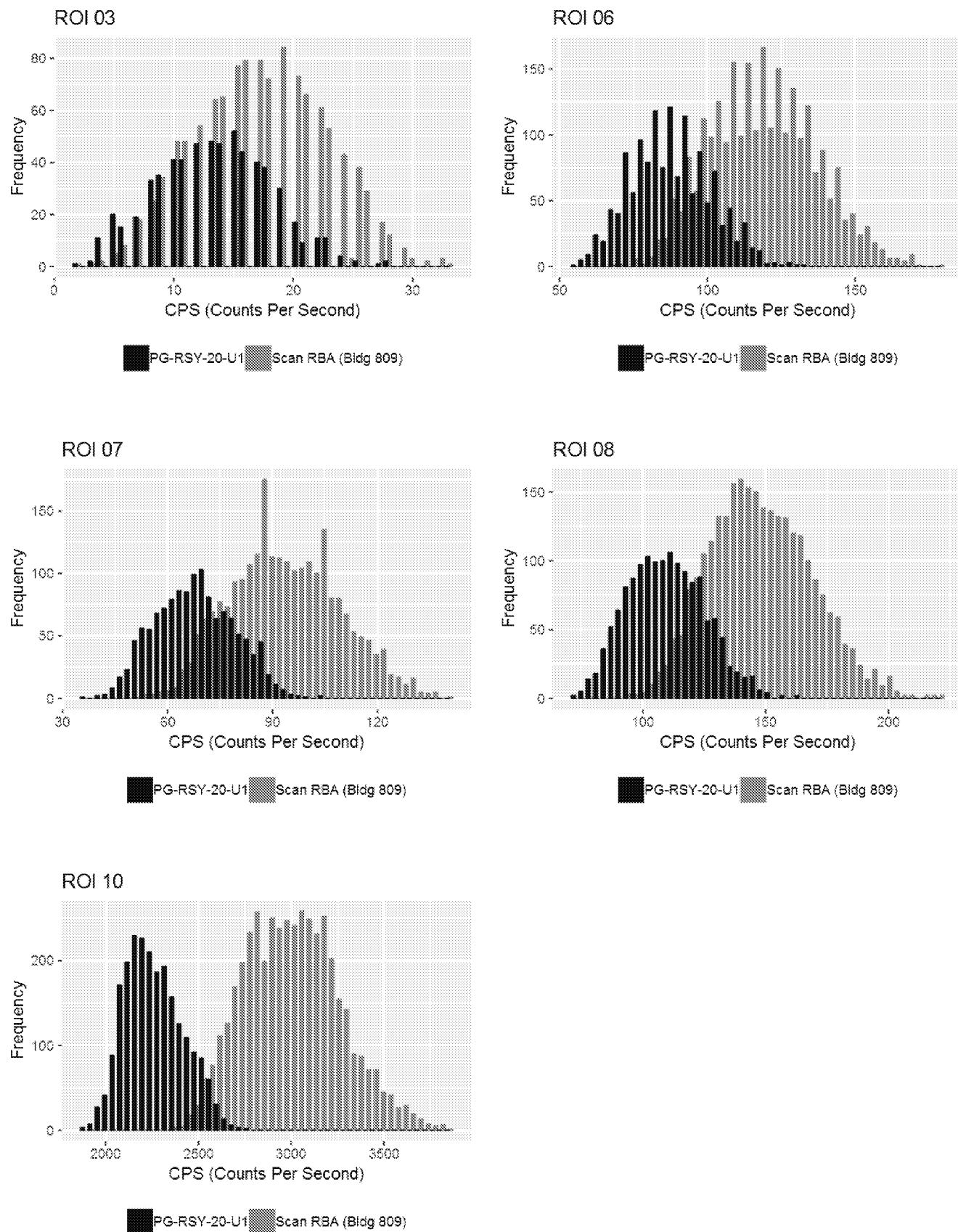
Soil Scan Statistics

Normal Q-Q Plots



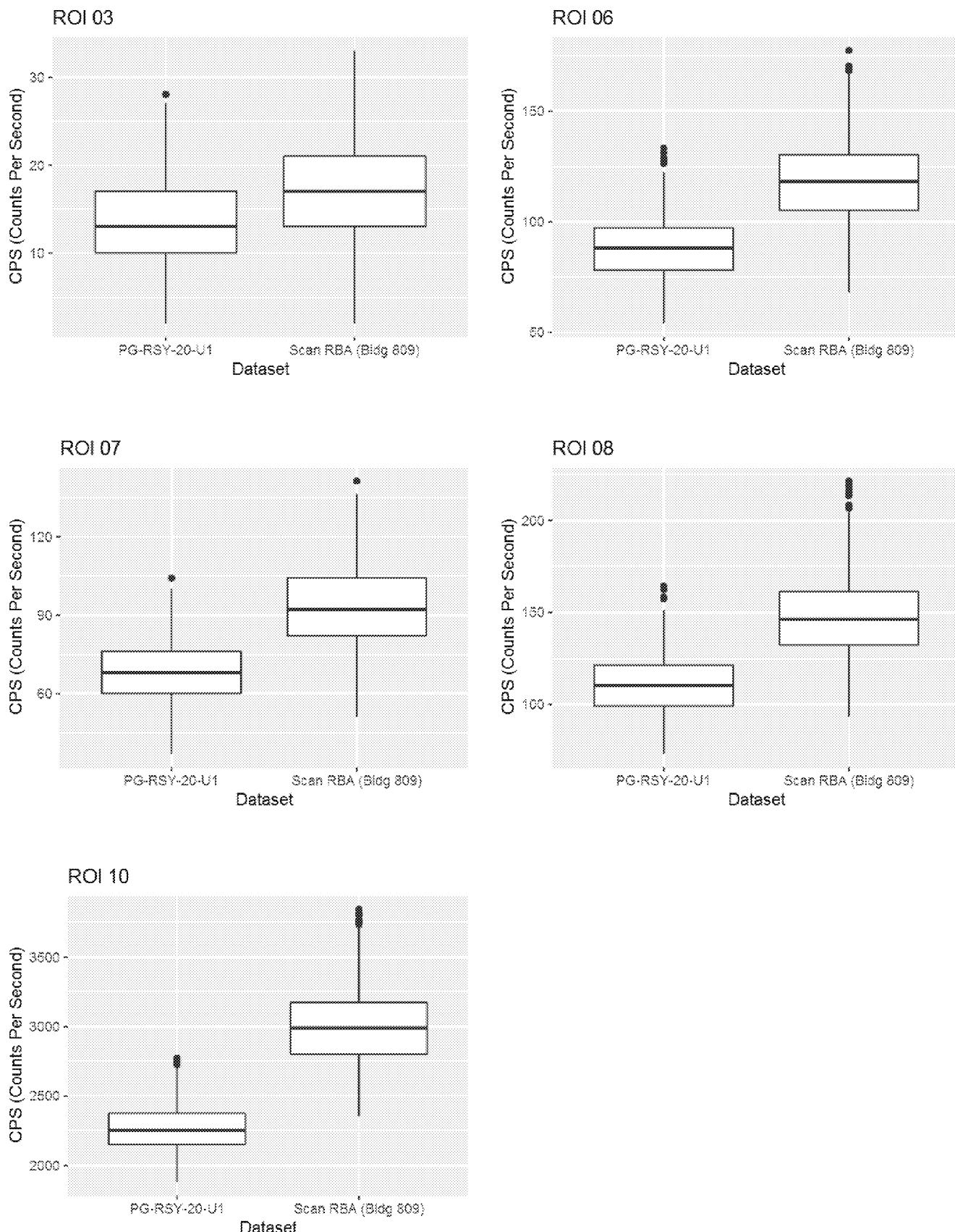
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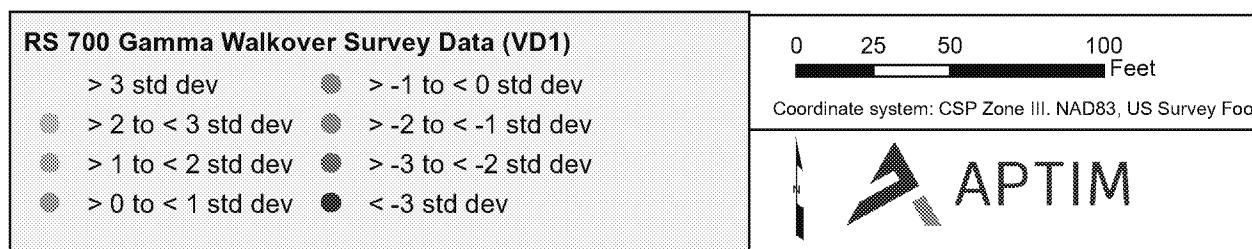
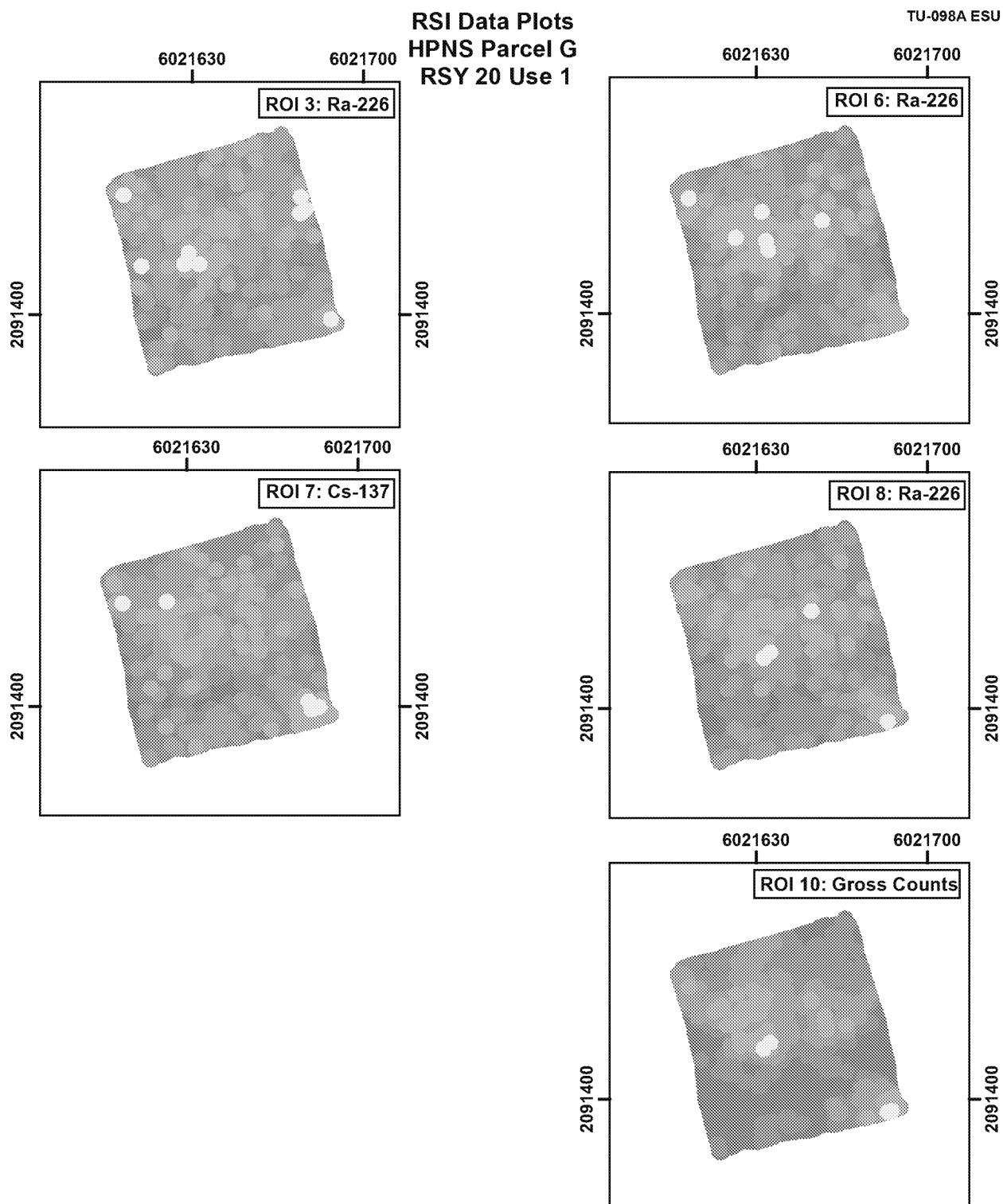
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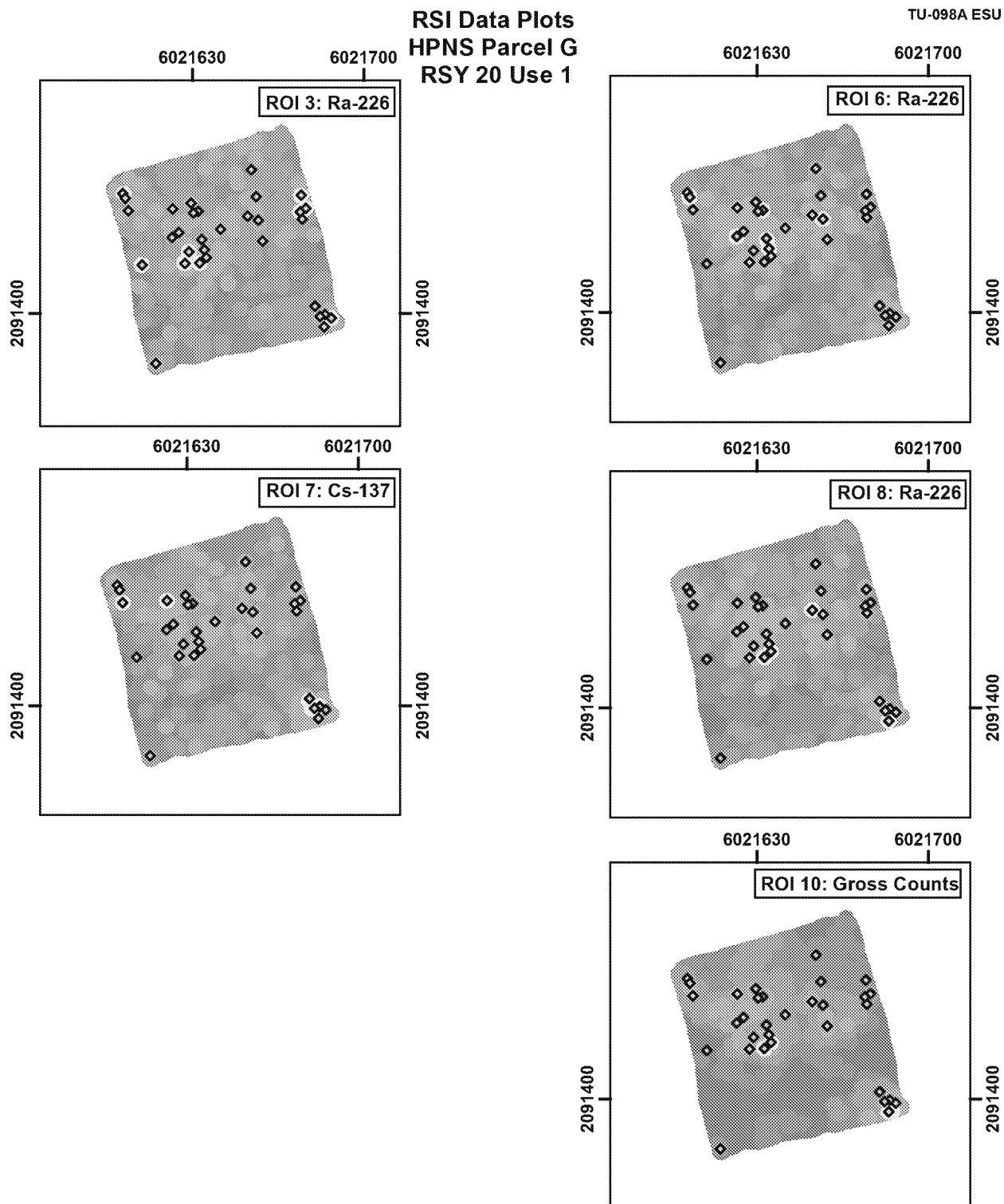


Soil Scan Statistics

Box Plots






RS 700 Gamma Walkover Survey Data (VD1)

- ◆ Follow-Up Location
- > -1 to < 0 std dev
- > 3 std dev
- > -2 to < -1 std dev
- > 2 to < 3 std dev
- > -3 to < -2 std dev
- > 1 to < 2 std dev
- < -3 std dev
- > 0 to < 1 std dev

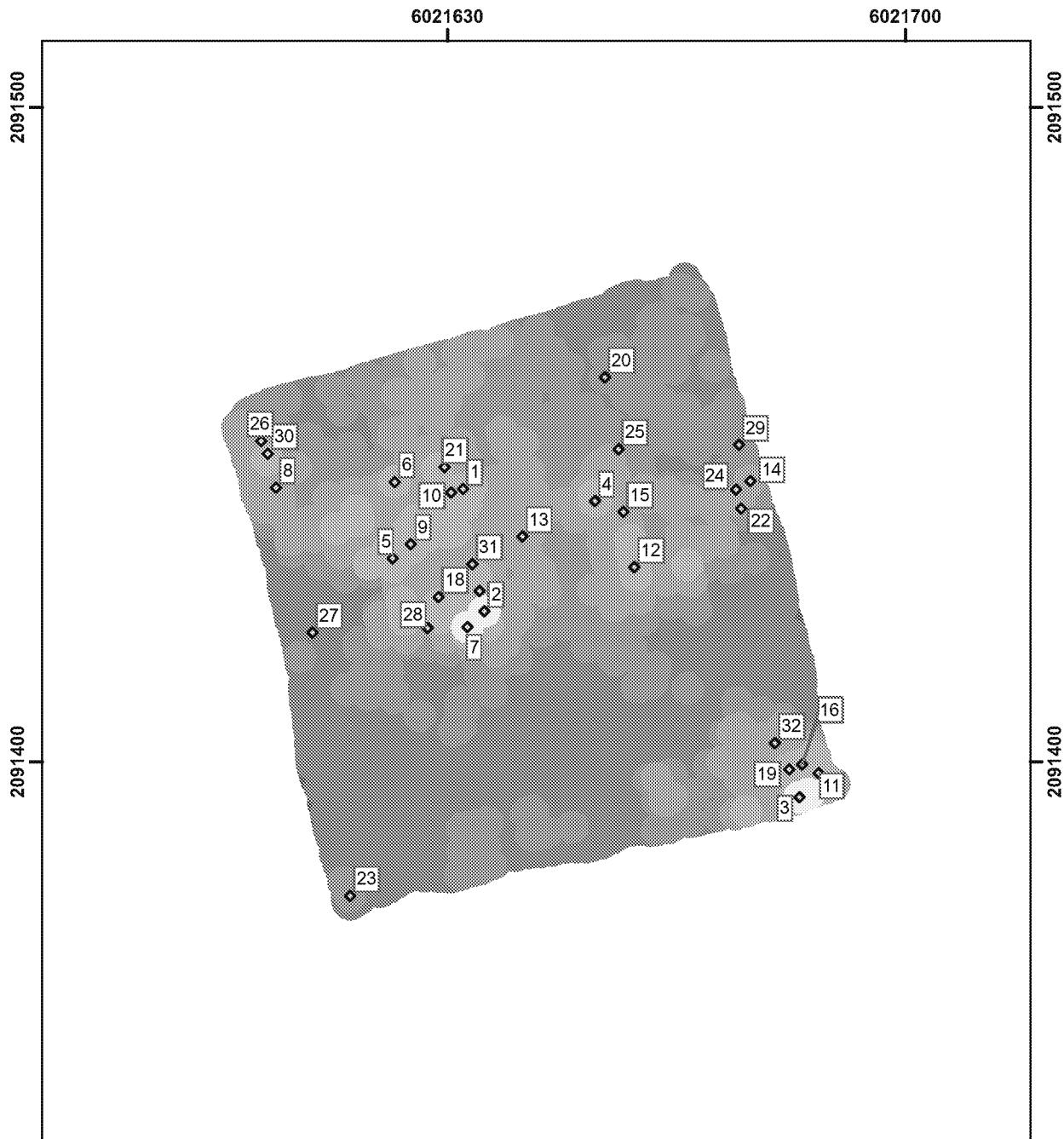
0 25 50 100
Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



**Follow-Up Static Survey
HPNS Parcel G
RSY 20 Use 1**

TU-098A ESU



RSY 20 Use 1 (VD1, ROI 10 Gross Gamma)

- ◆ Follow-Up Location
- > 1 to < 2 std dev
- > -2 to < -1 std dev
- > 3 std dev
- > 0 to < 1 std dev
- > -3 to < -2 std dev
- > 2 to < 3 std dev
- > -1 to < 0 std dev
- < -3 std dev

20 10 0 20 Feet

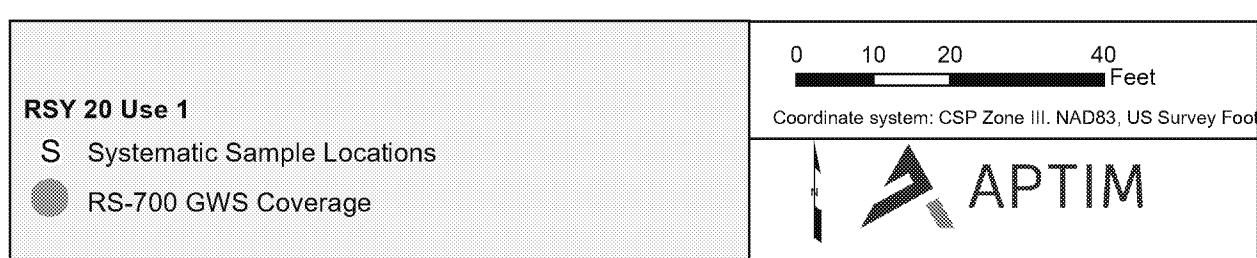
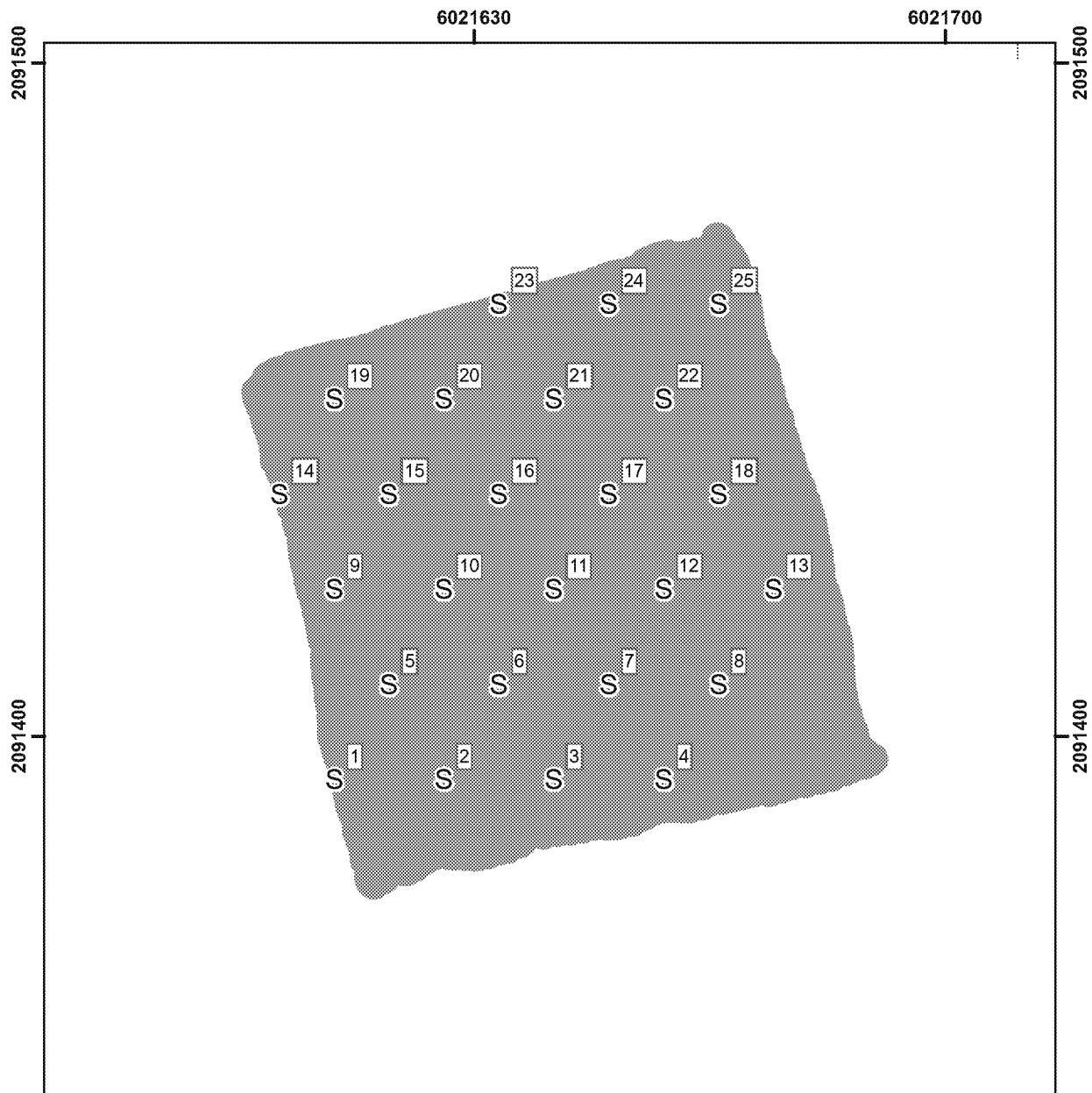
Coordinate system: CSP Zone III, NAD83, US Survey Foot



APTIM

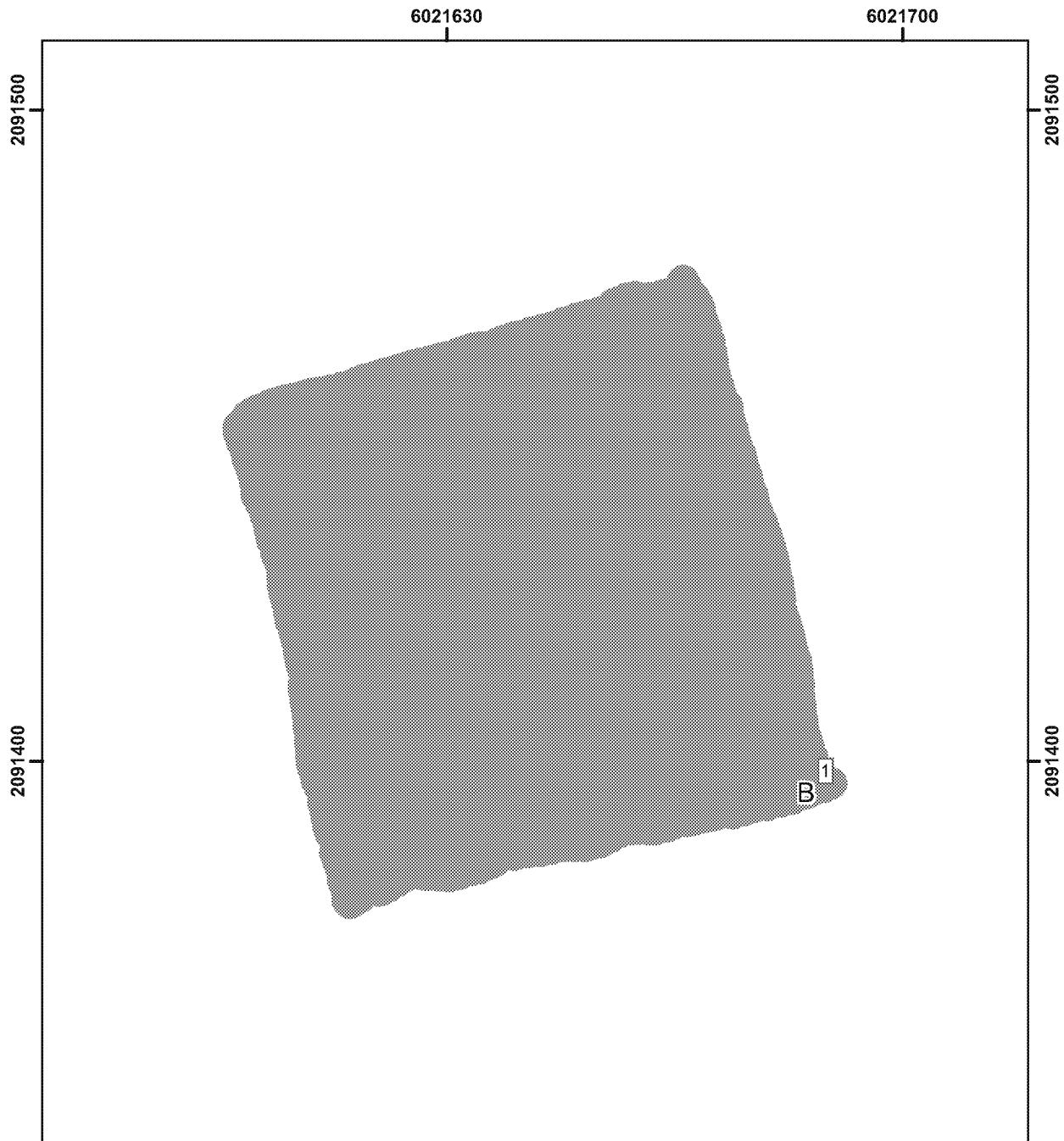
Systematic Sampling
HPNS Parcel G
RSY 20 Use 1

TU-098A ESU



**Biased Sample Map
HPNS Parcel G
RSY 20 Use 1**

TU-098A ESU



RSY 20 Use 1

B Biased Sample Locations

● RS-700 GWS Coverage

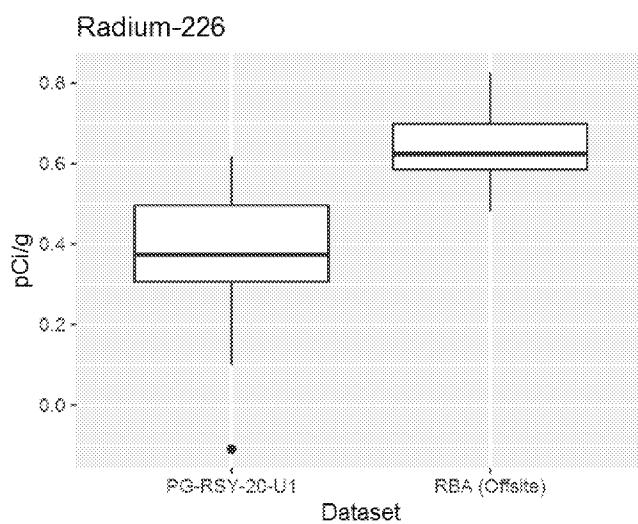
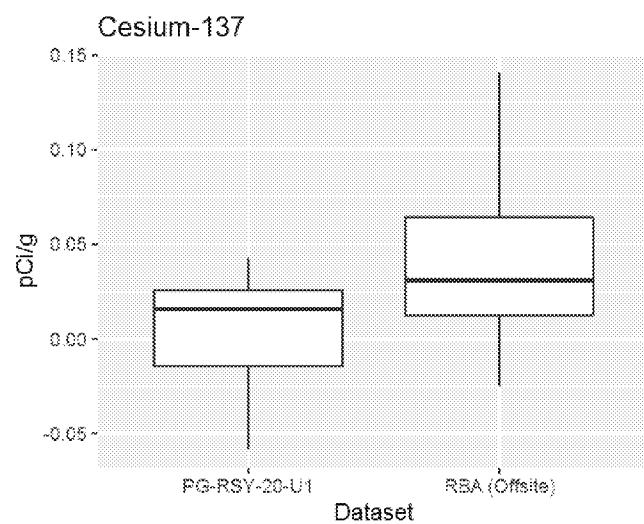
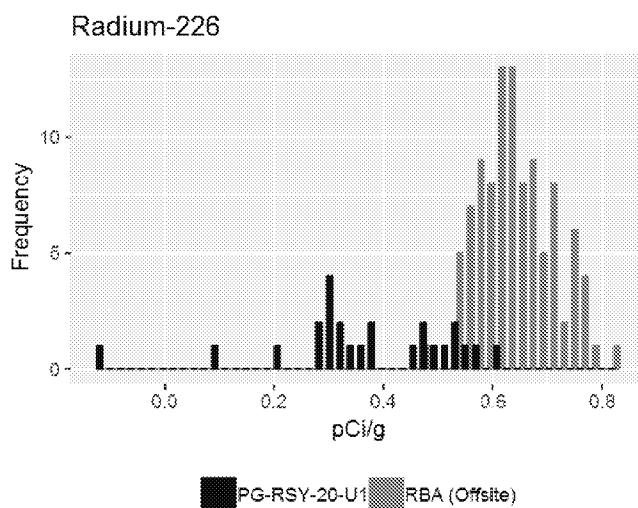
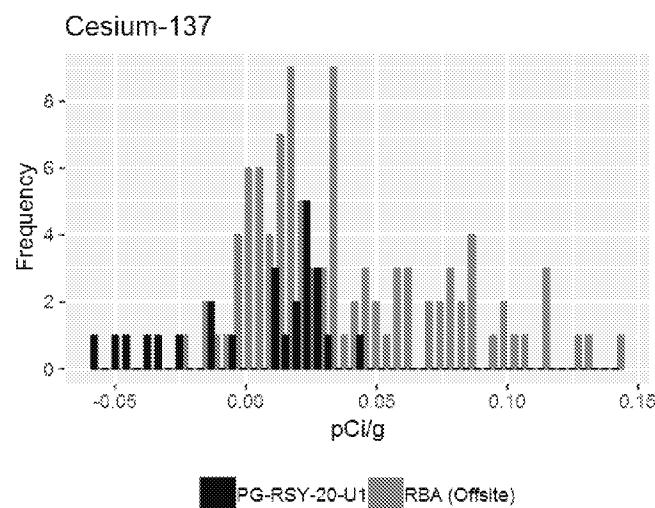
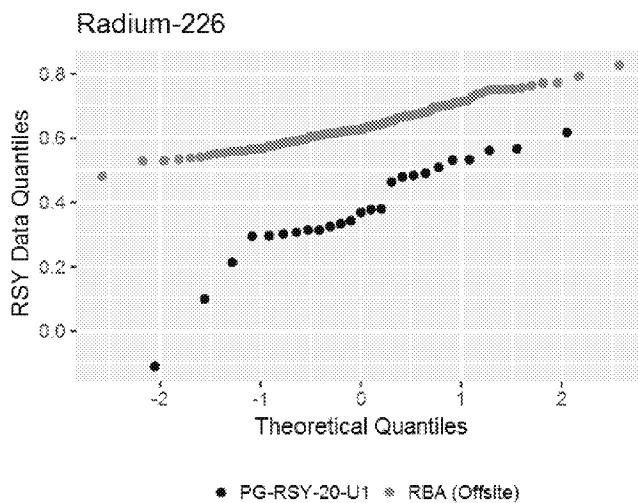
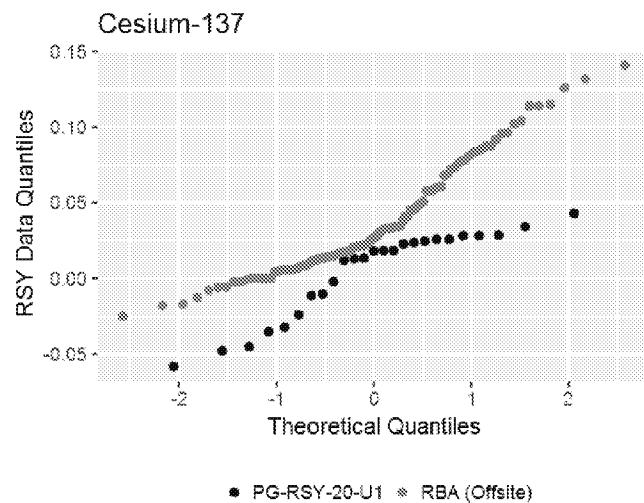
25 12.5 0 25 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



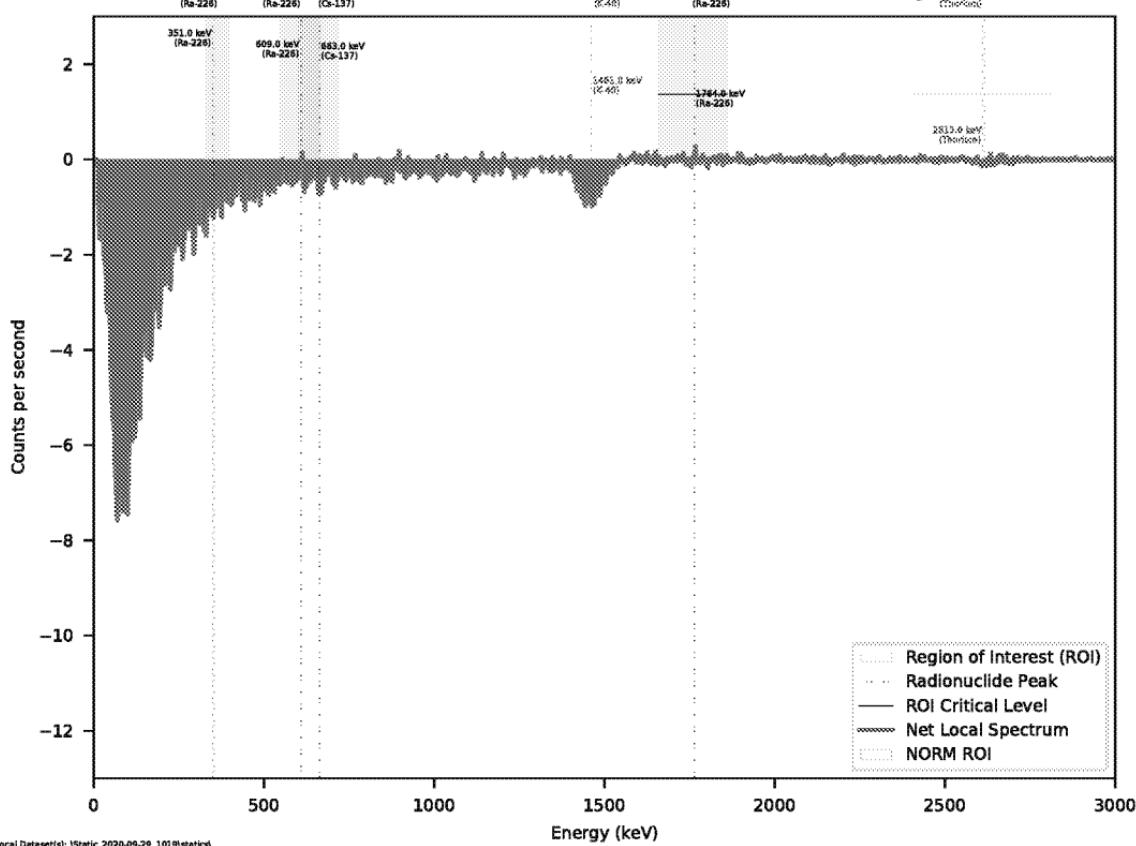
APTIM

Soil Sample Statistics



Net Gamma Spectrum, Static Location: 1

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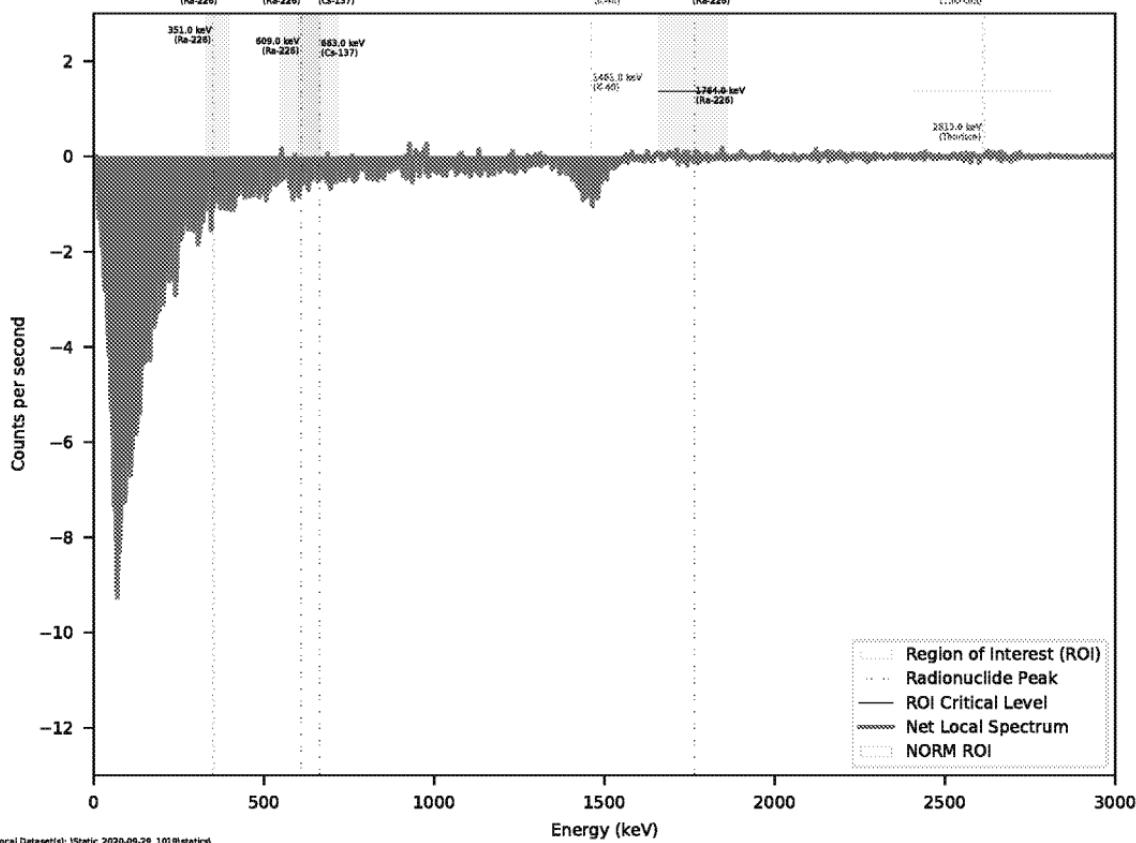
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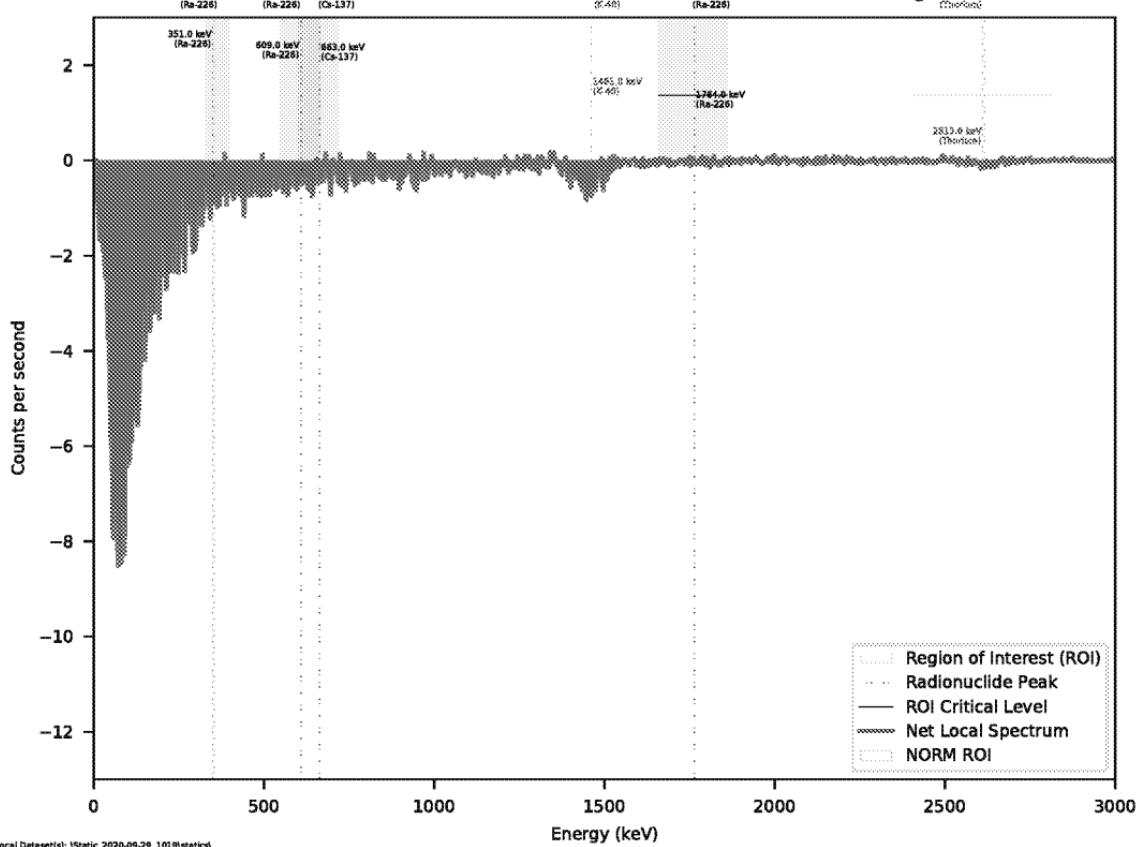
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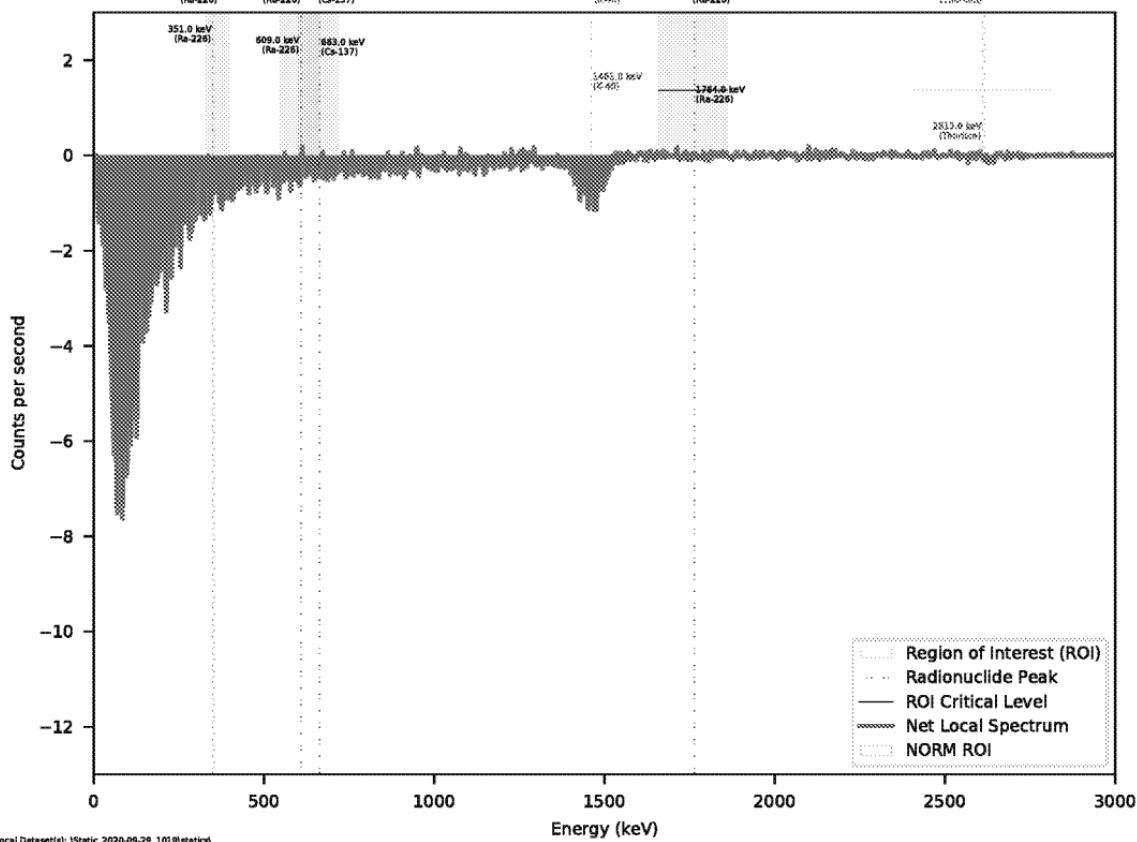
Net Gamma Spectrum, Static Location: 3

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Net Gamma Spectrum, Static Location: 4

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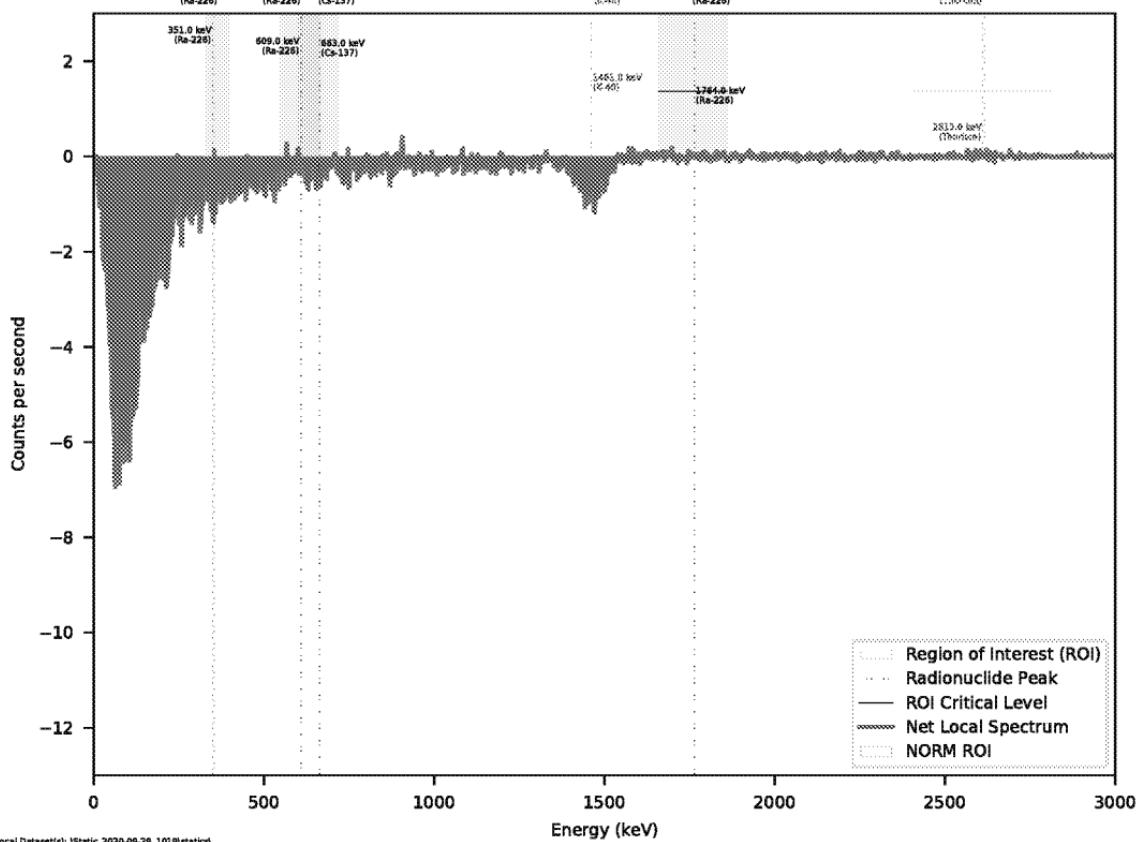
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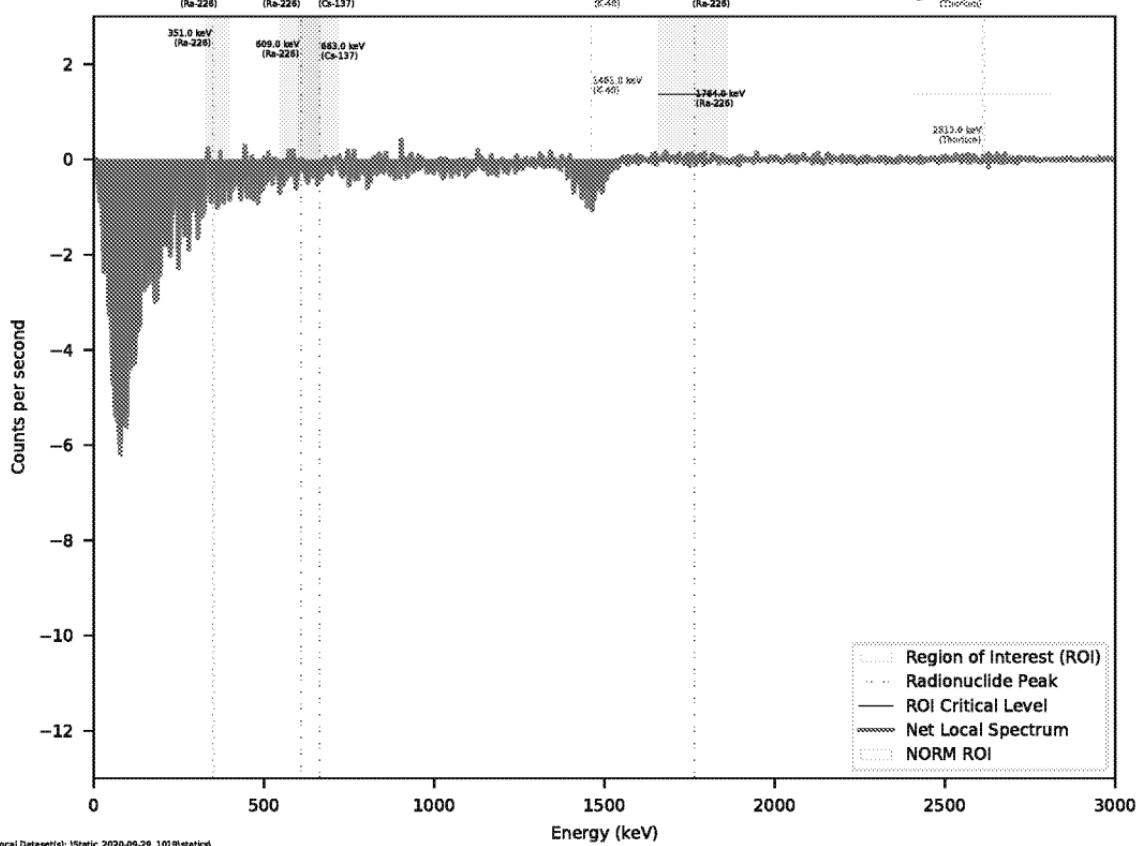
Net Gamma Spectrum, Static Location: 5

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Net Gamma Spectrum, Static Location: 6

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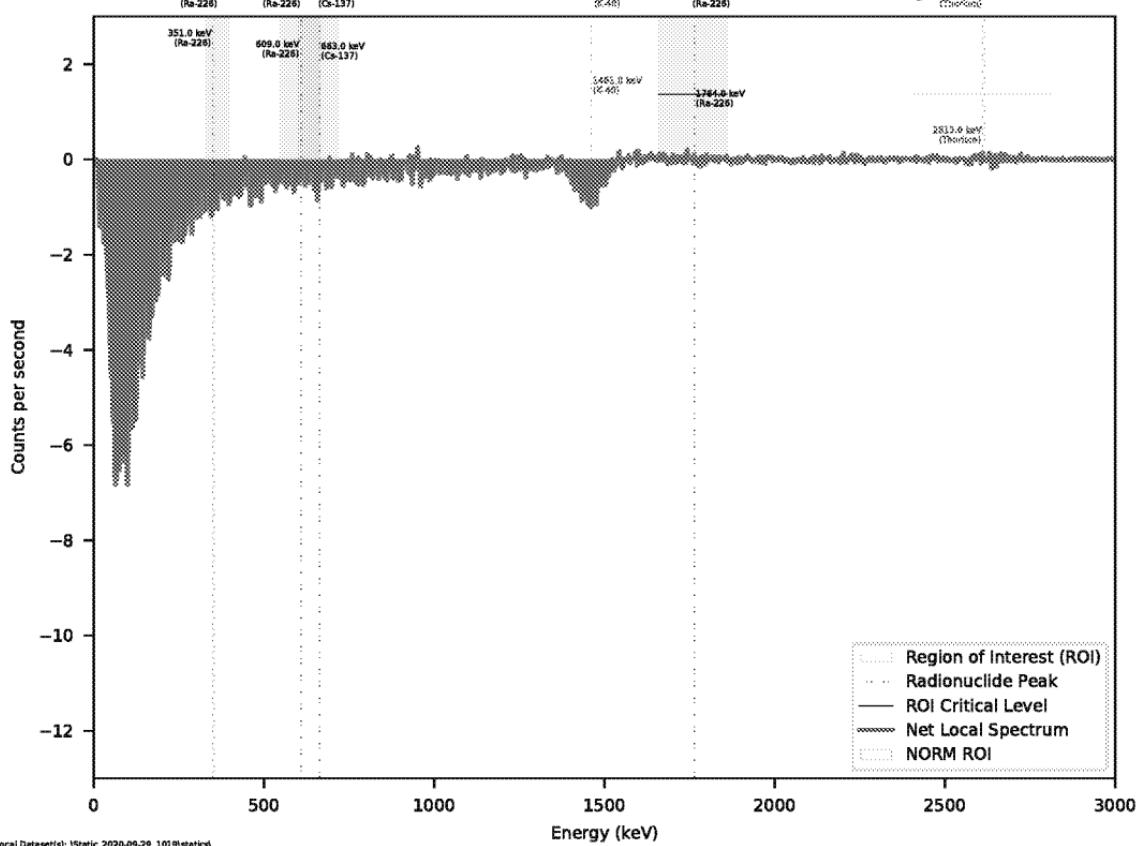
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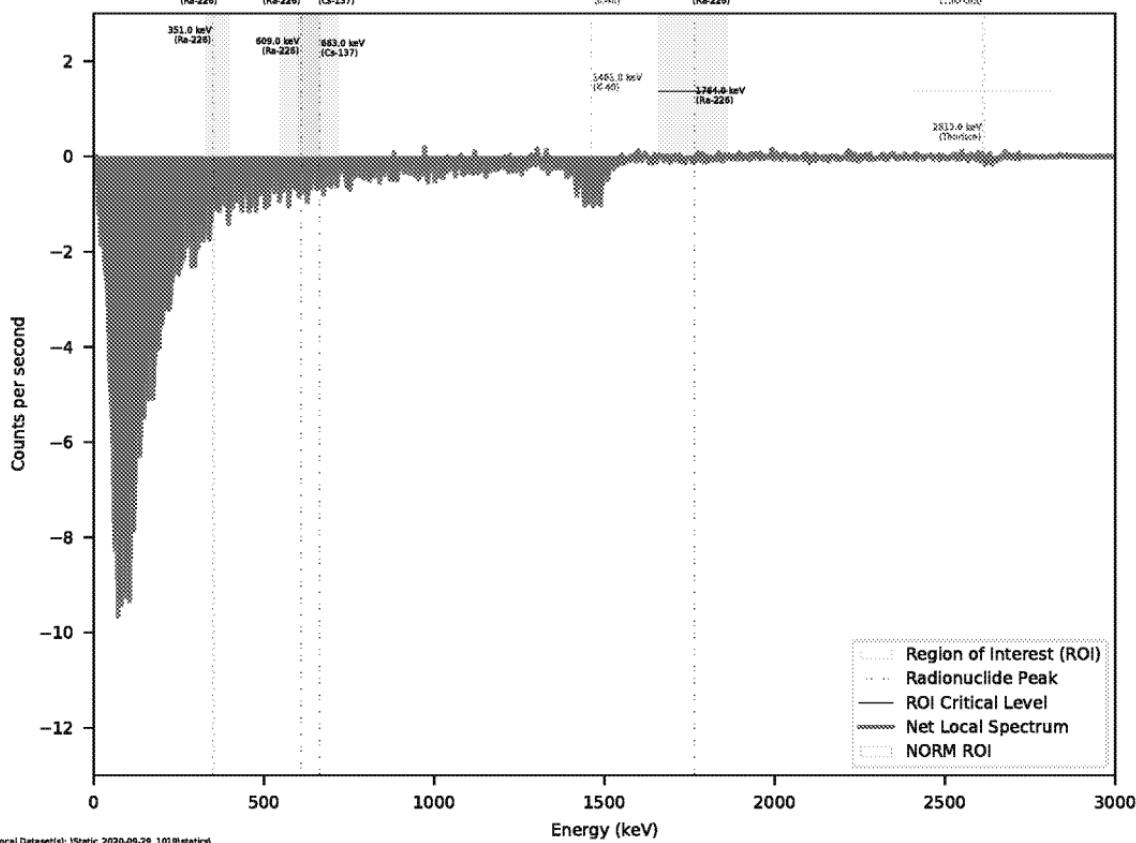
Net Gamma Spectrum, Static Location: 7

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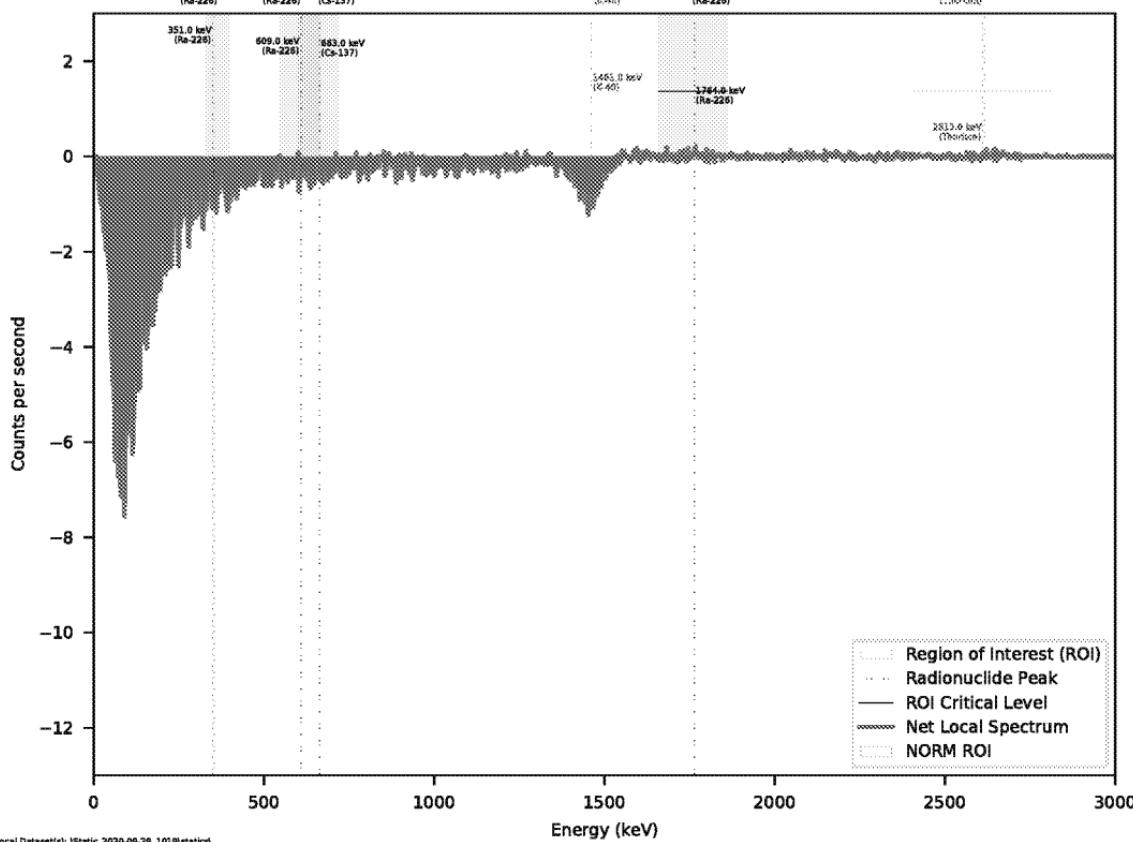
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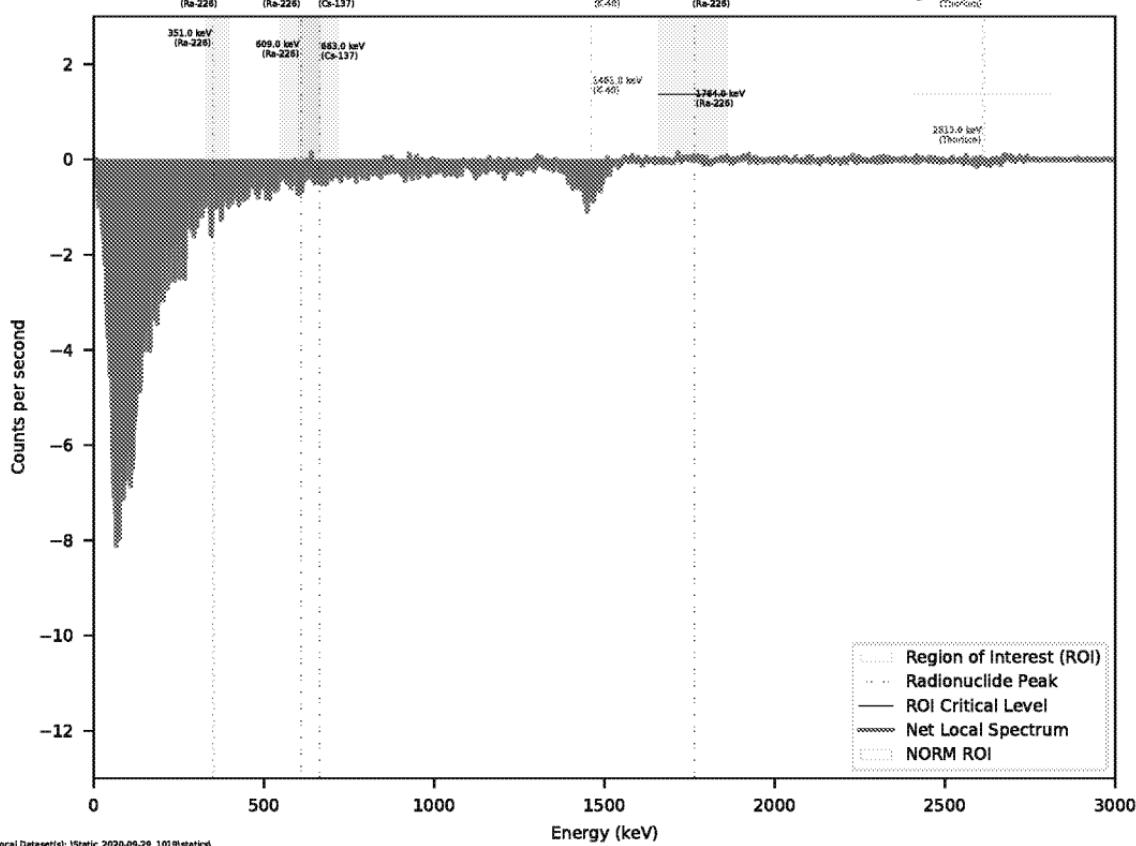
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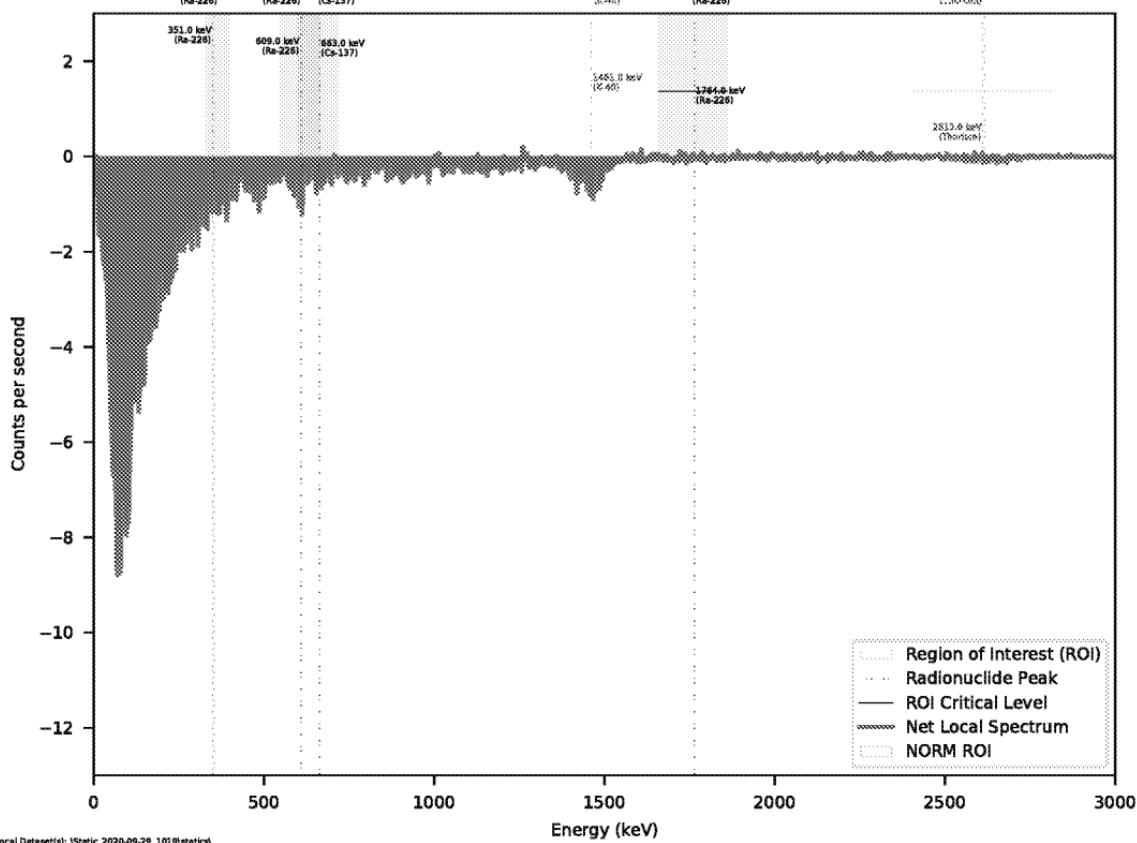
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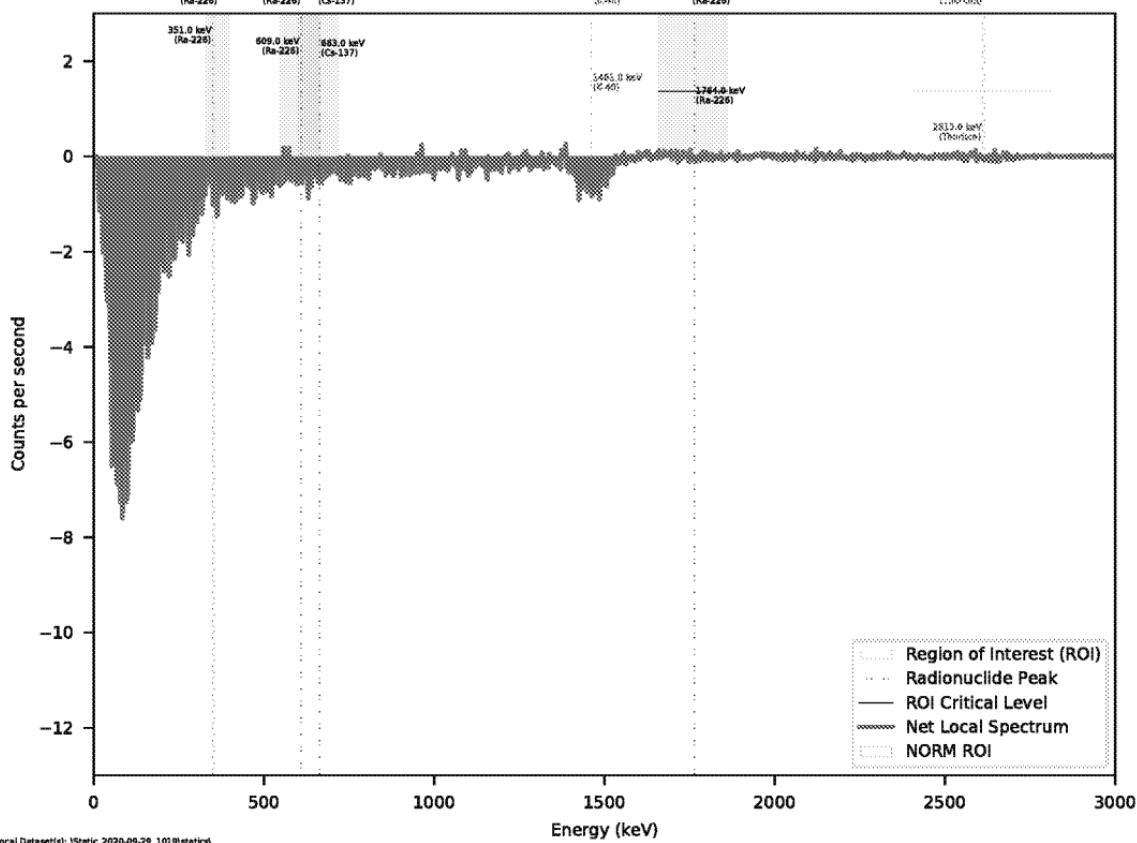
Net Gamma Spectrum, Static Location: 11

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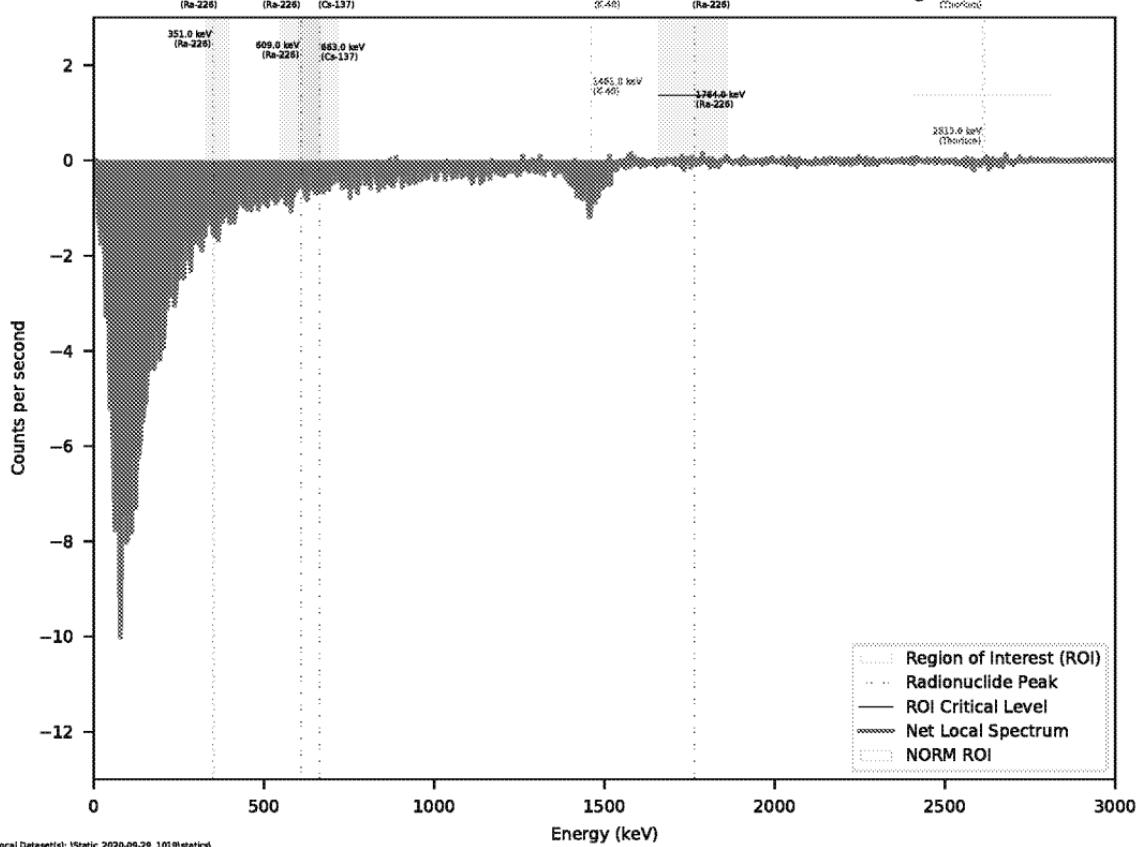
Net Gamma Spectrum, Static Location: 12

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Net Gamma Spectrum, Static Location: 13

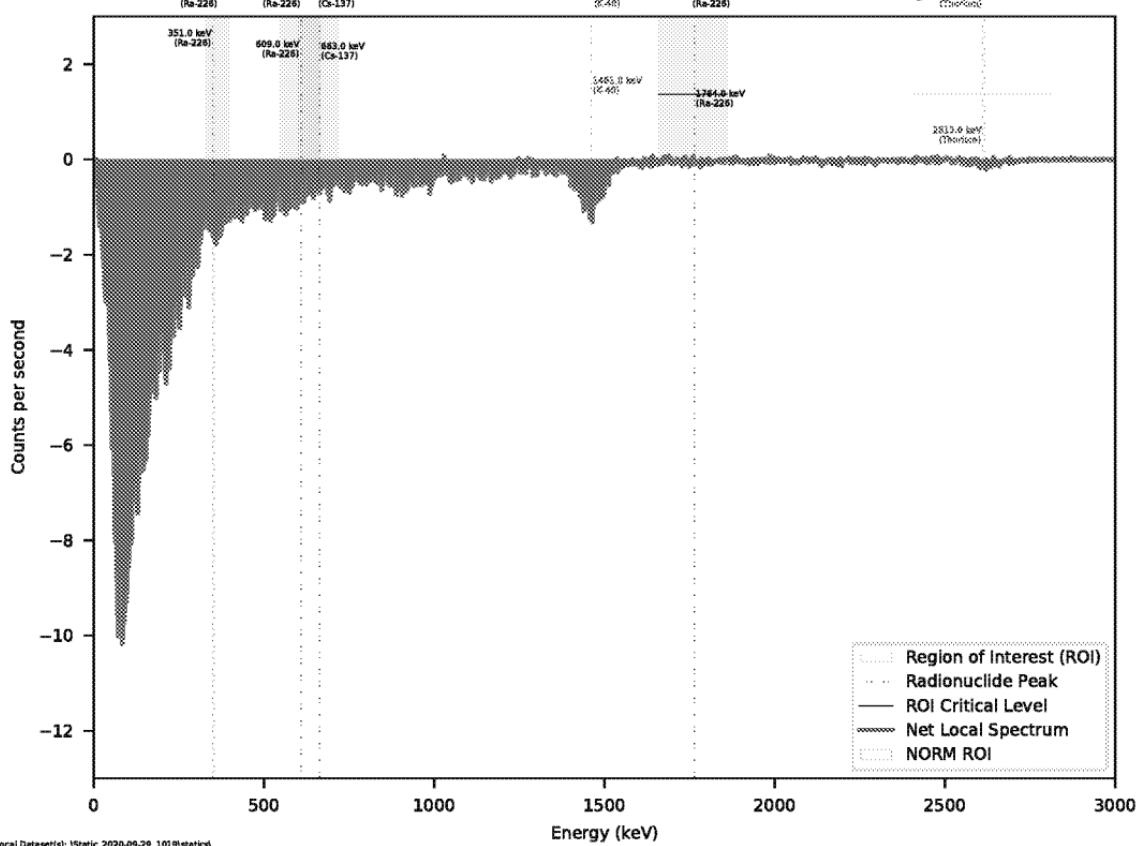
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Net Gamma Spectrum, Static Location: 14

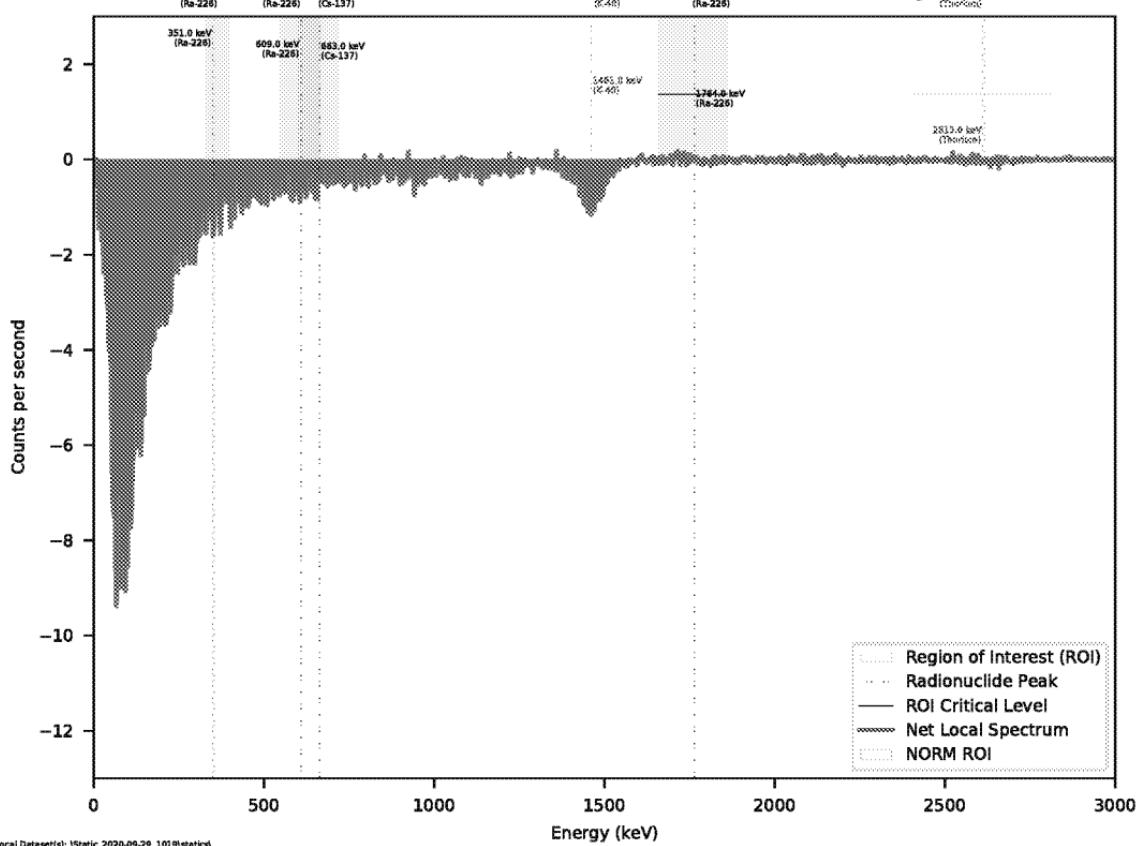
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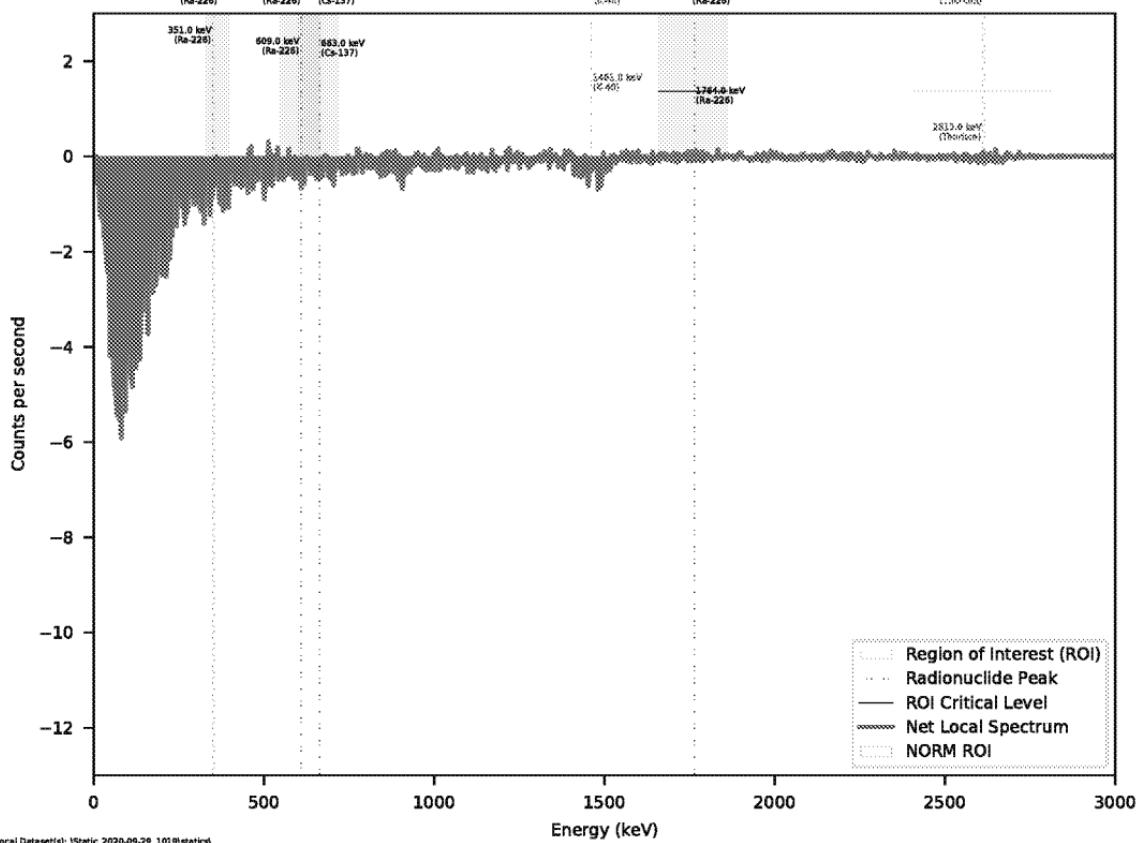
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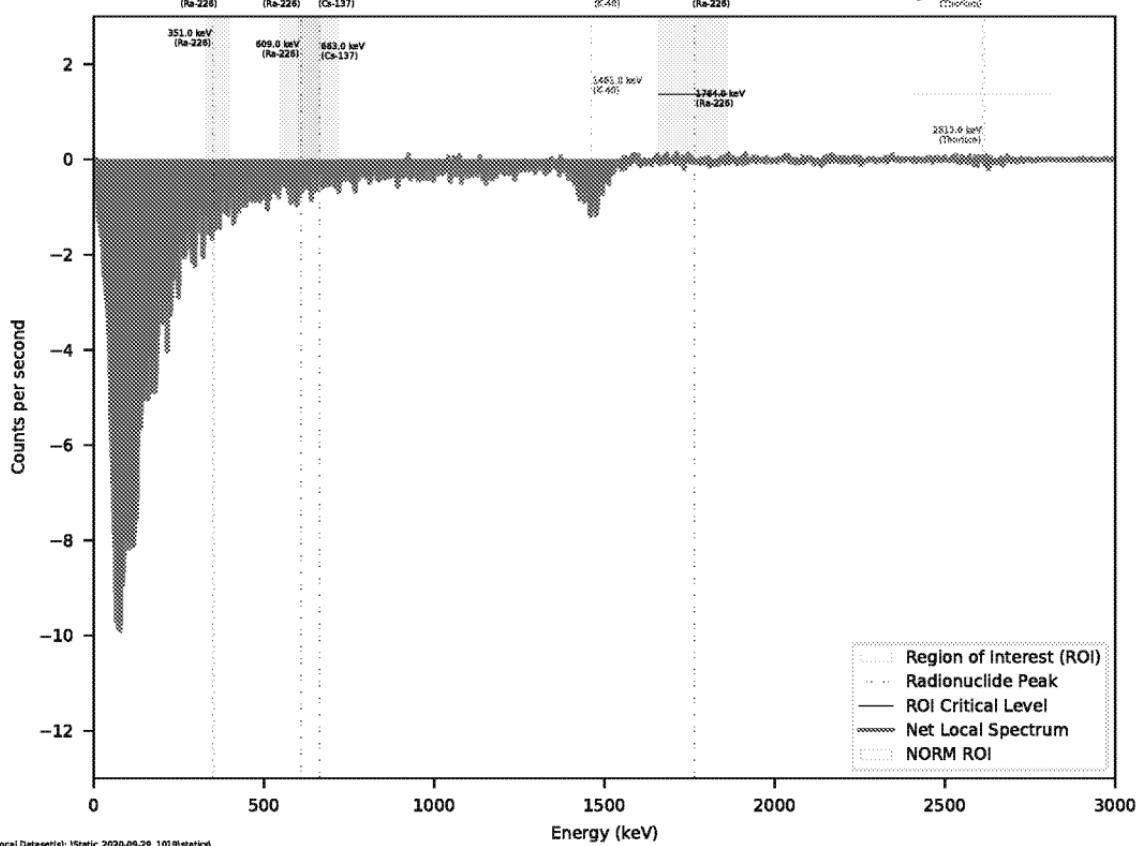
Net Gamma Spectrum, Static Location: 16

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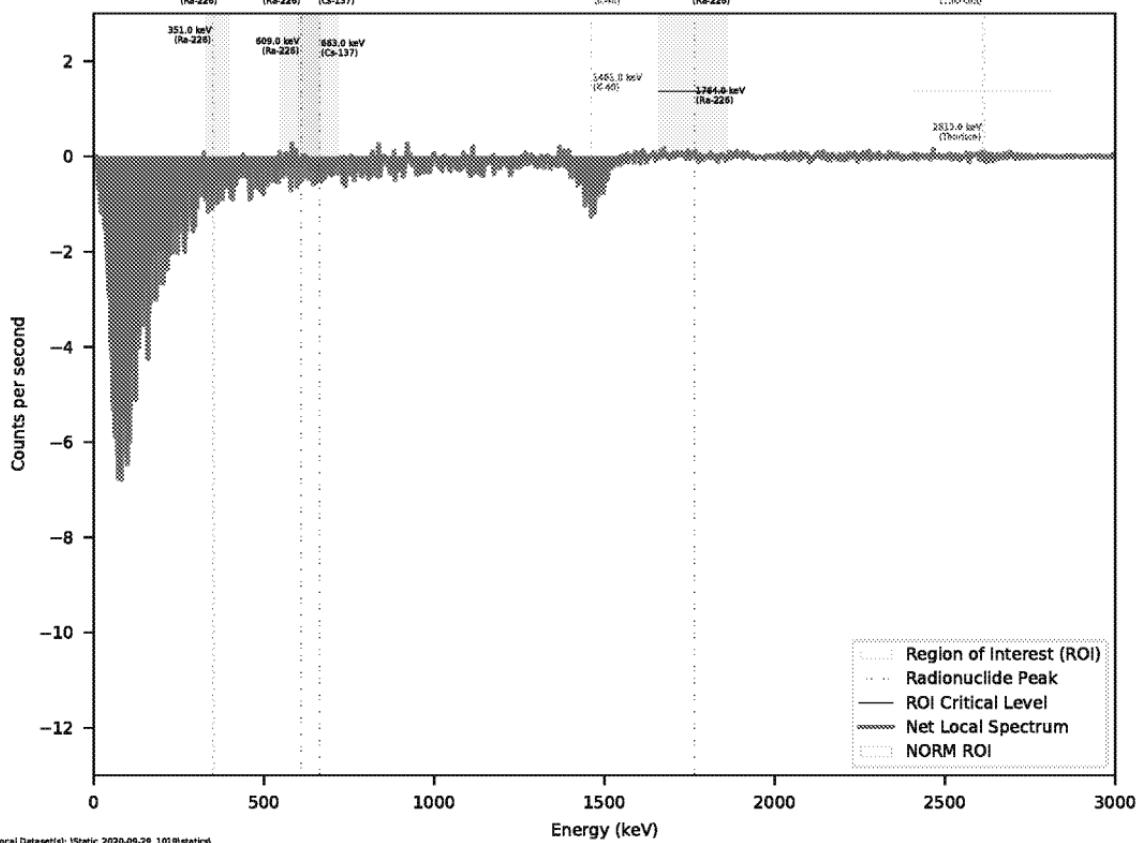
Net Gamma Spectrum, Static Location: 17

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Net Gamma Spectrum, Static Location: 18

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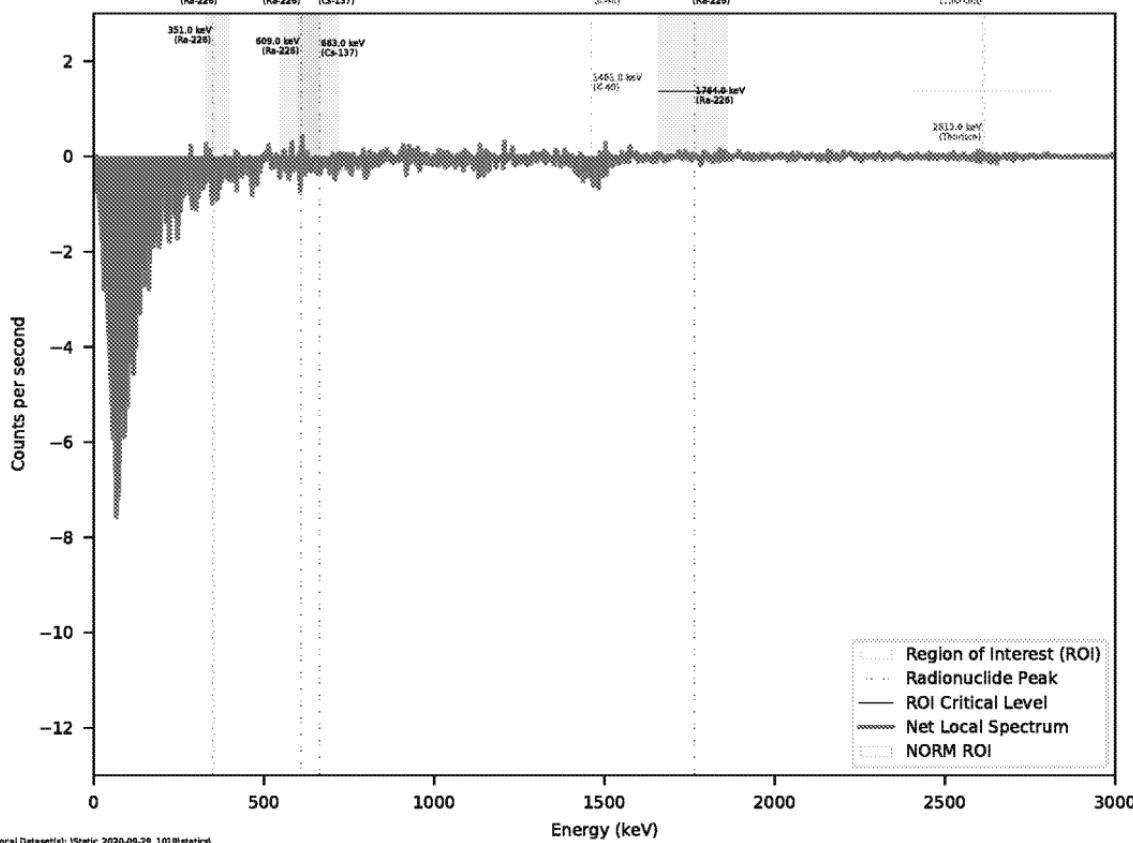
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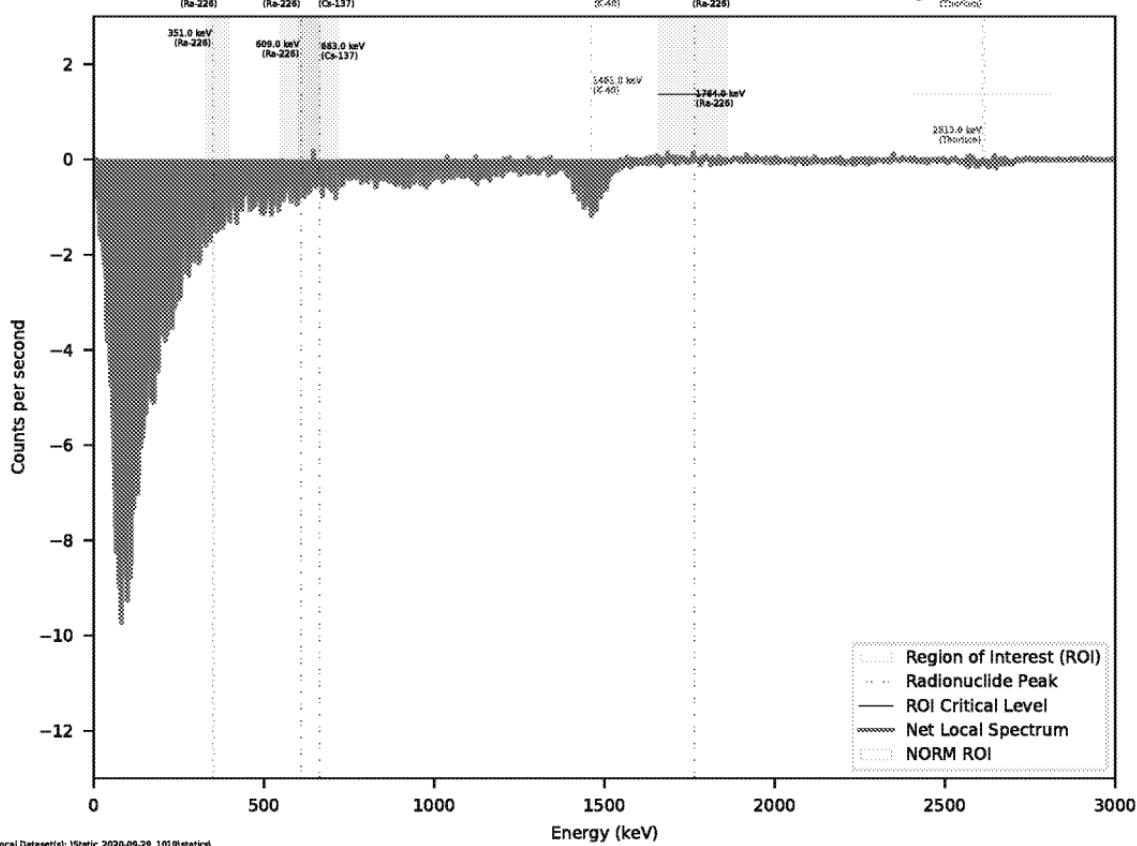
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Net Gamma Spectrum, Static Location: 20

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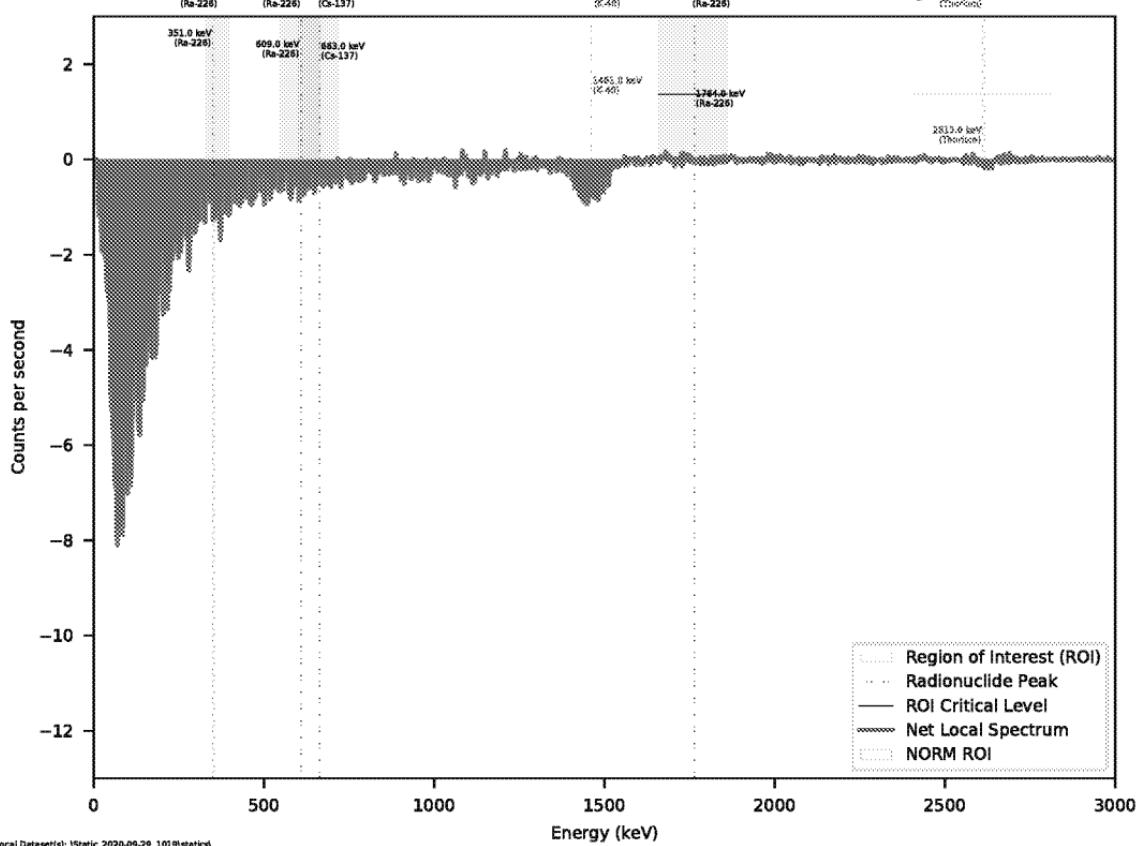
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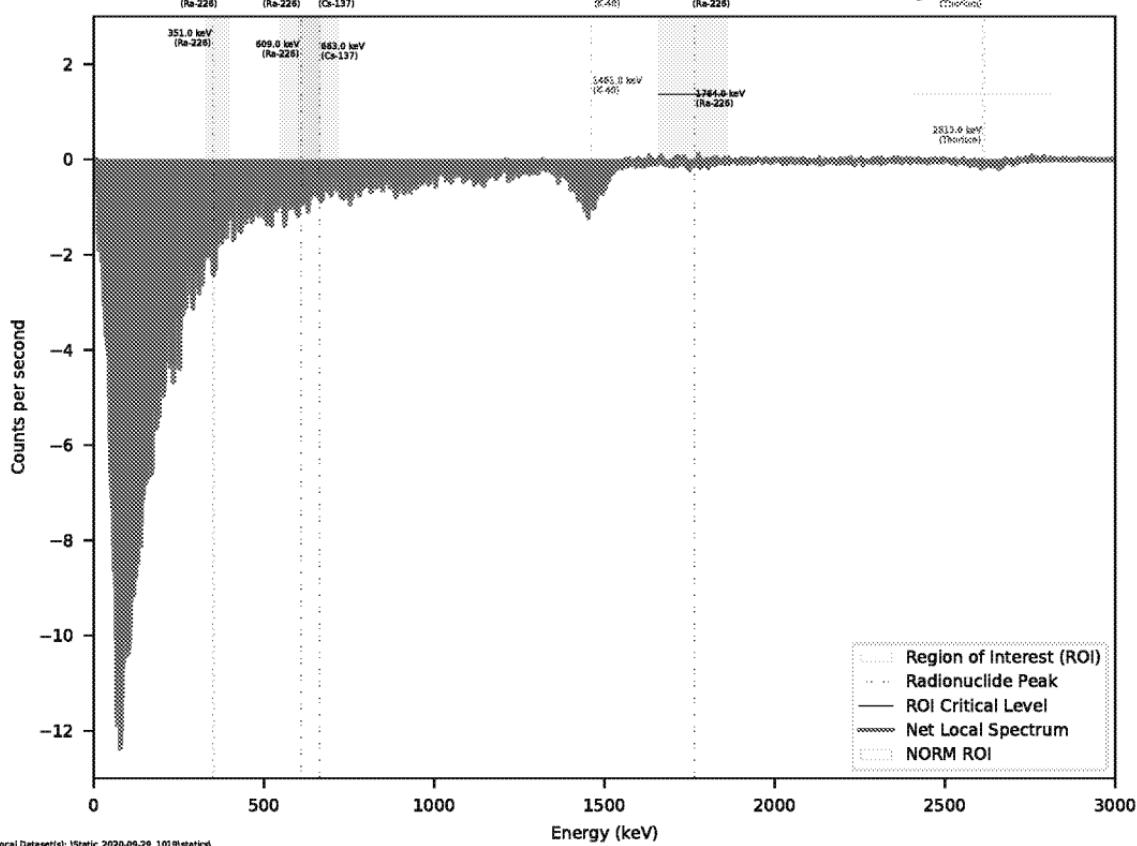
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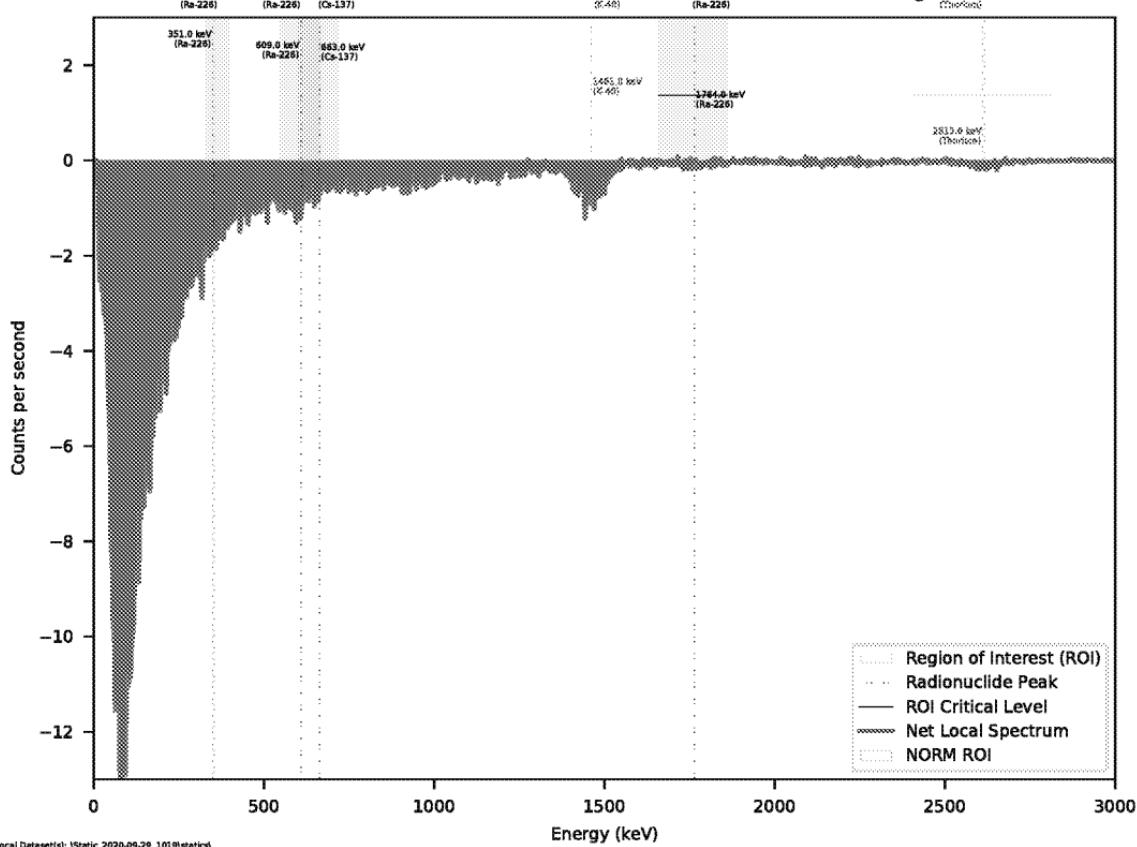
Net Gamma Spectrum, Static Location: 22

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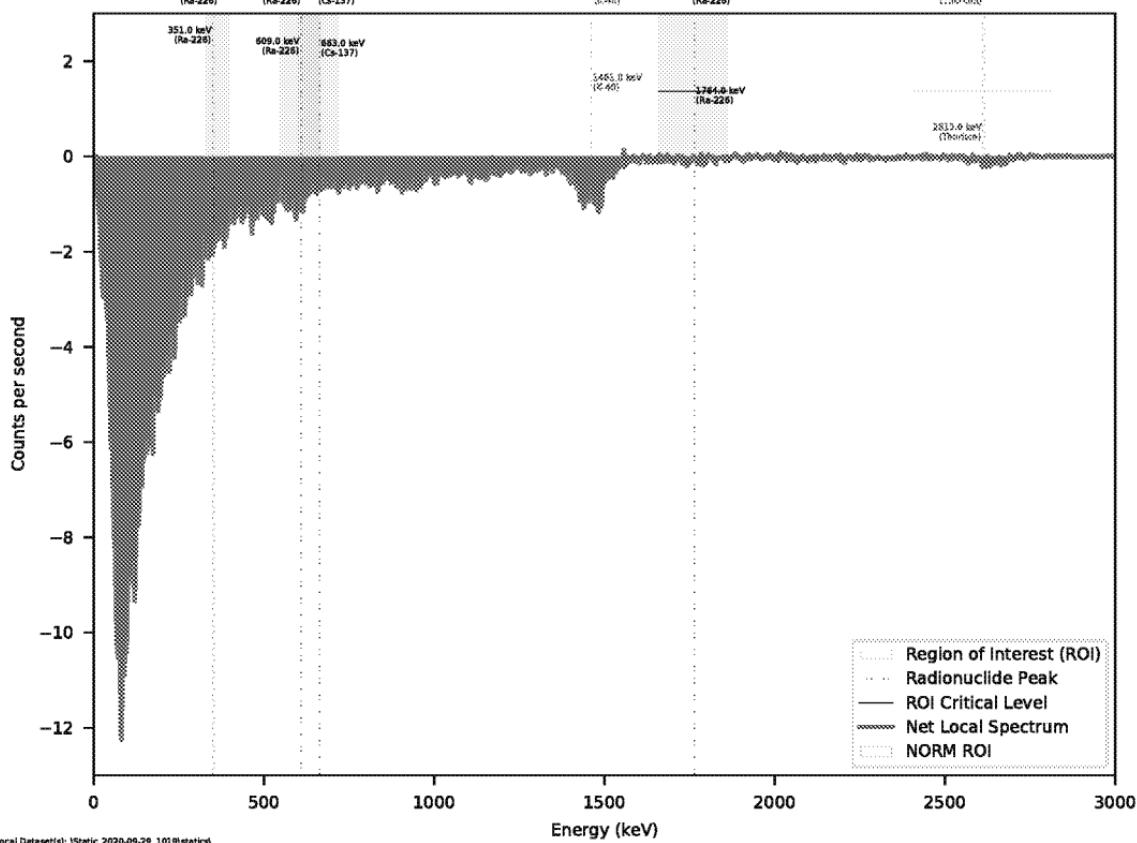
Net Gamma Spectrum, Static Location: 23

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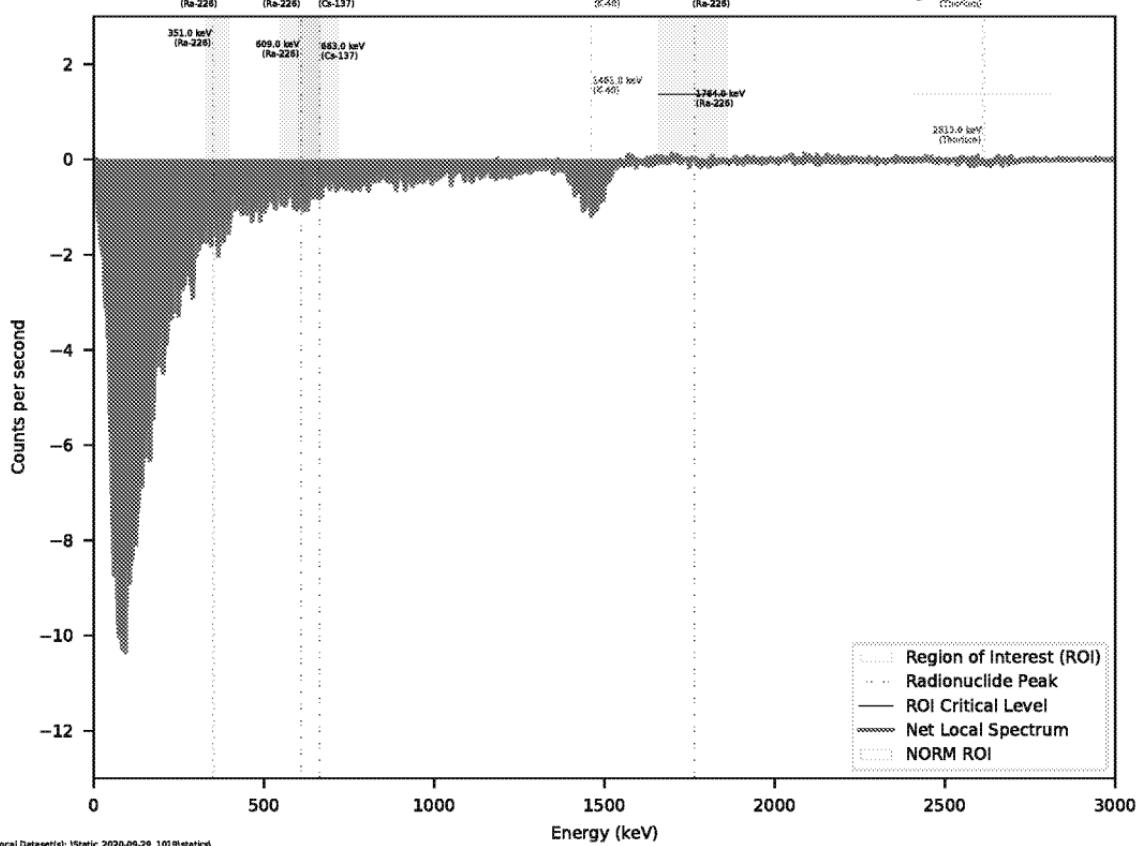
Net Gamma Spectrum, Static Location: 24

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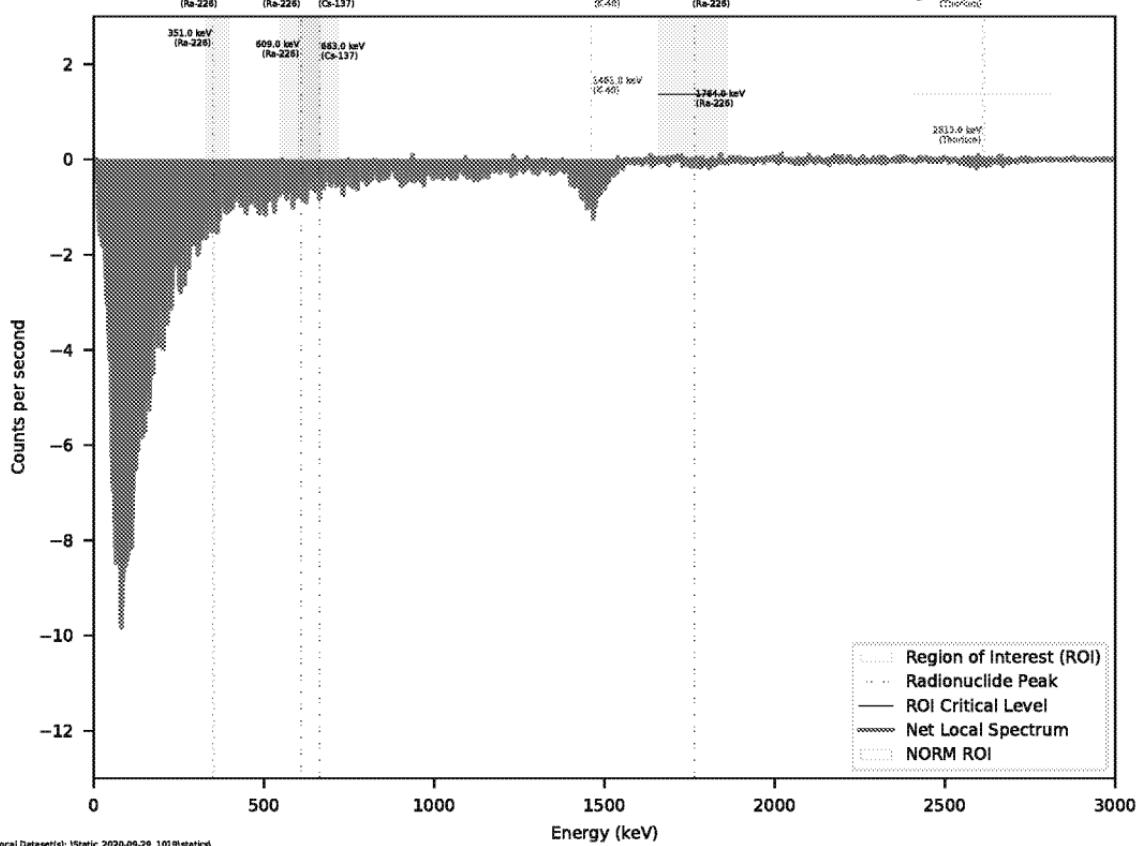
Net Gamma Spectrum, Static Location: 25

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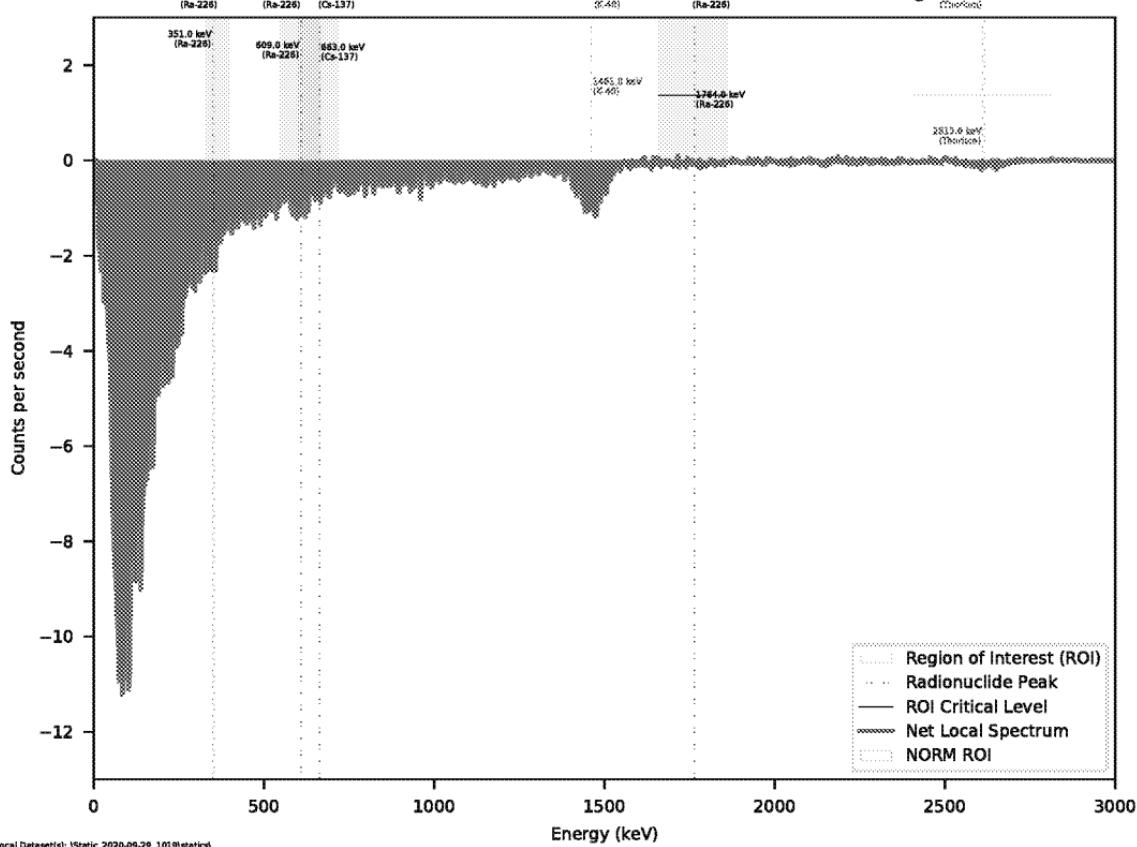
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Net Gamma Spectrum, Static Location: 27

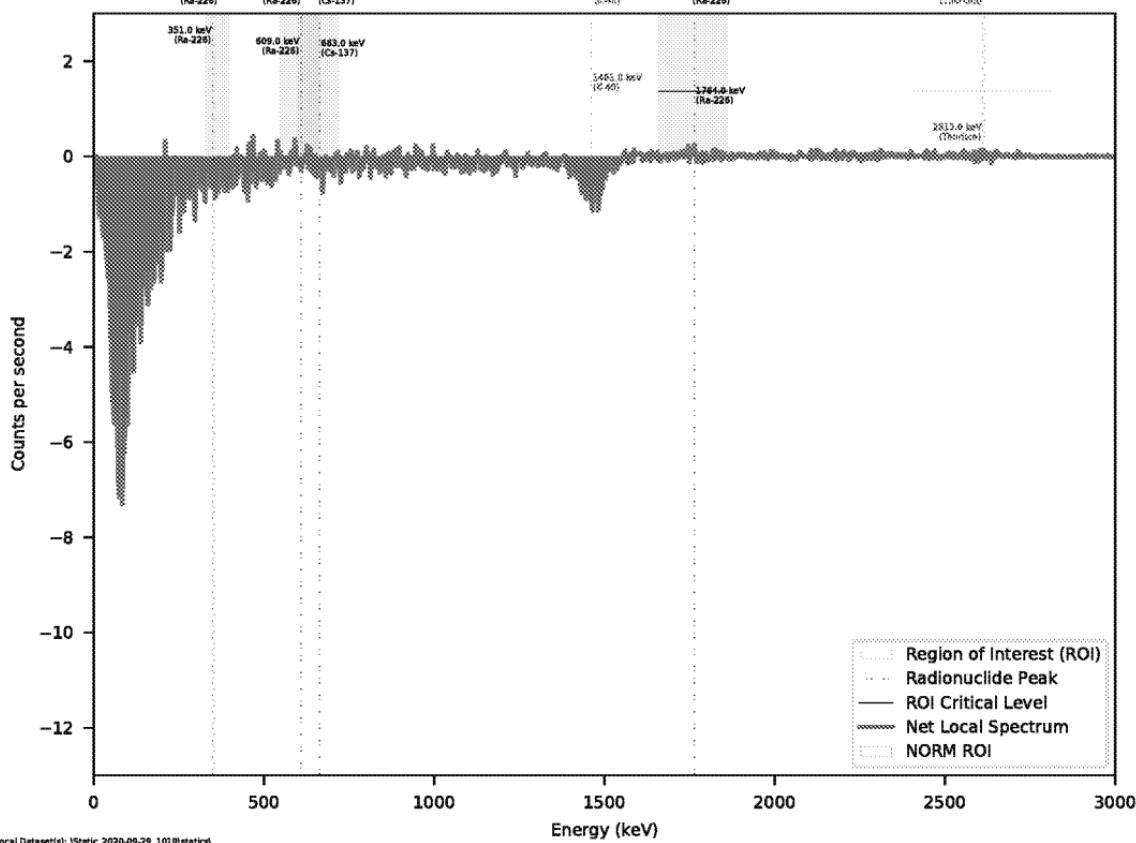
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ED_006360A_00000168-00040

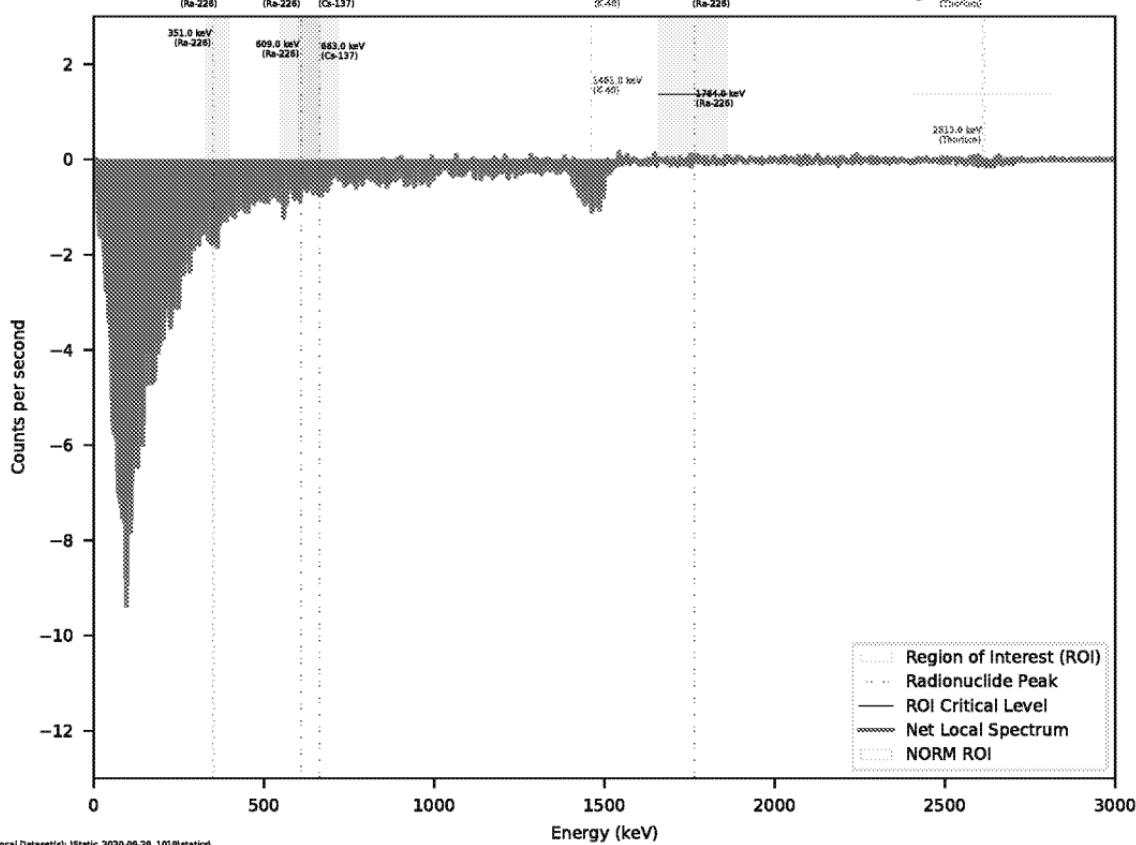
Net Gamma Spectrum, Static Location: 28

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Net Gamma Spectrum, Static Location: 29

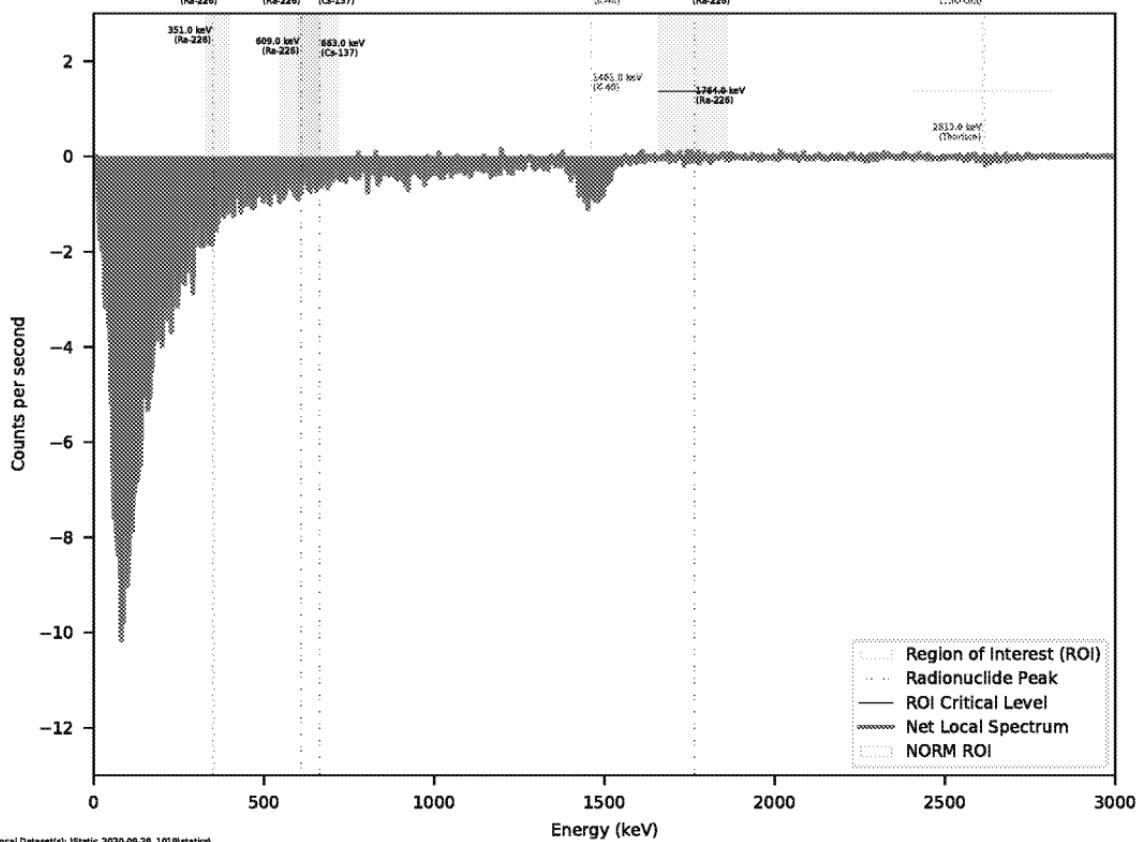
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ED_006360A_00000168-00042

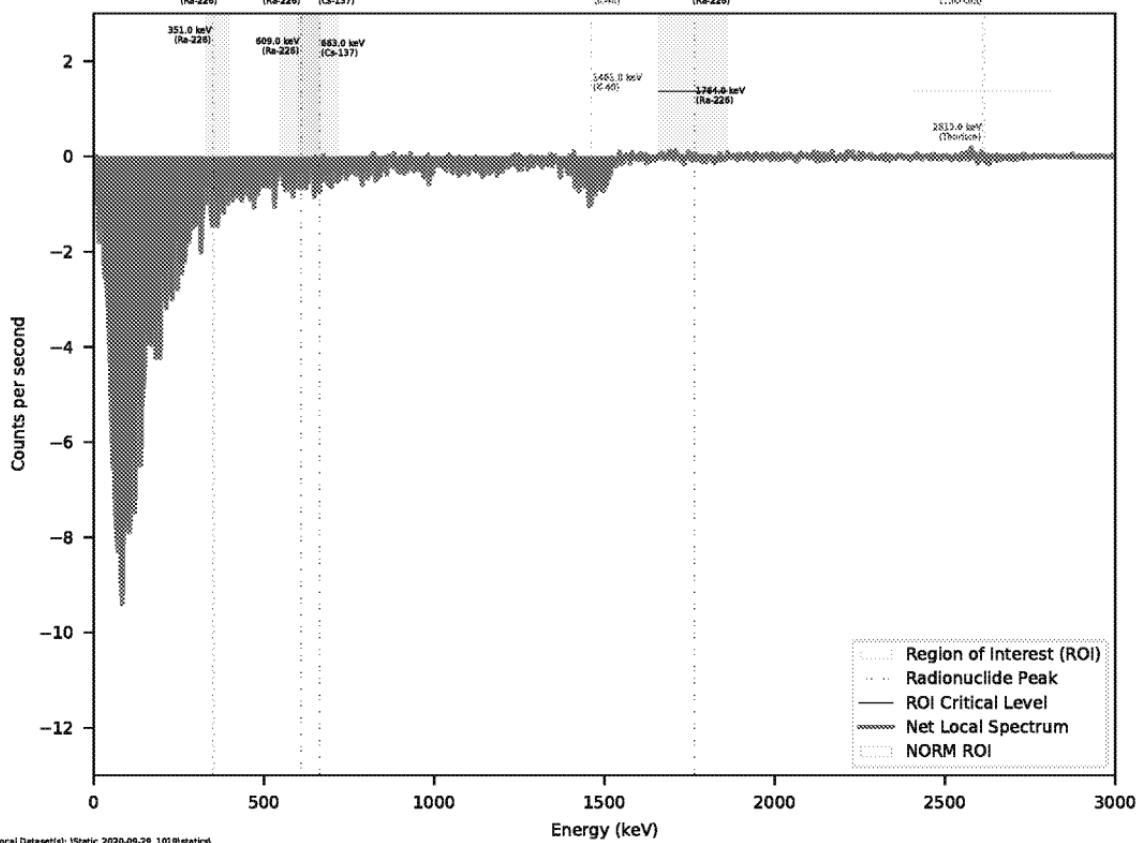
Net Gamma Spectrum, Static Location: 30

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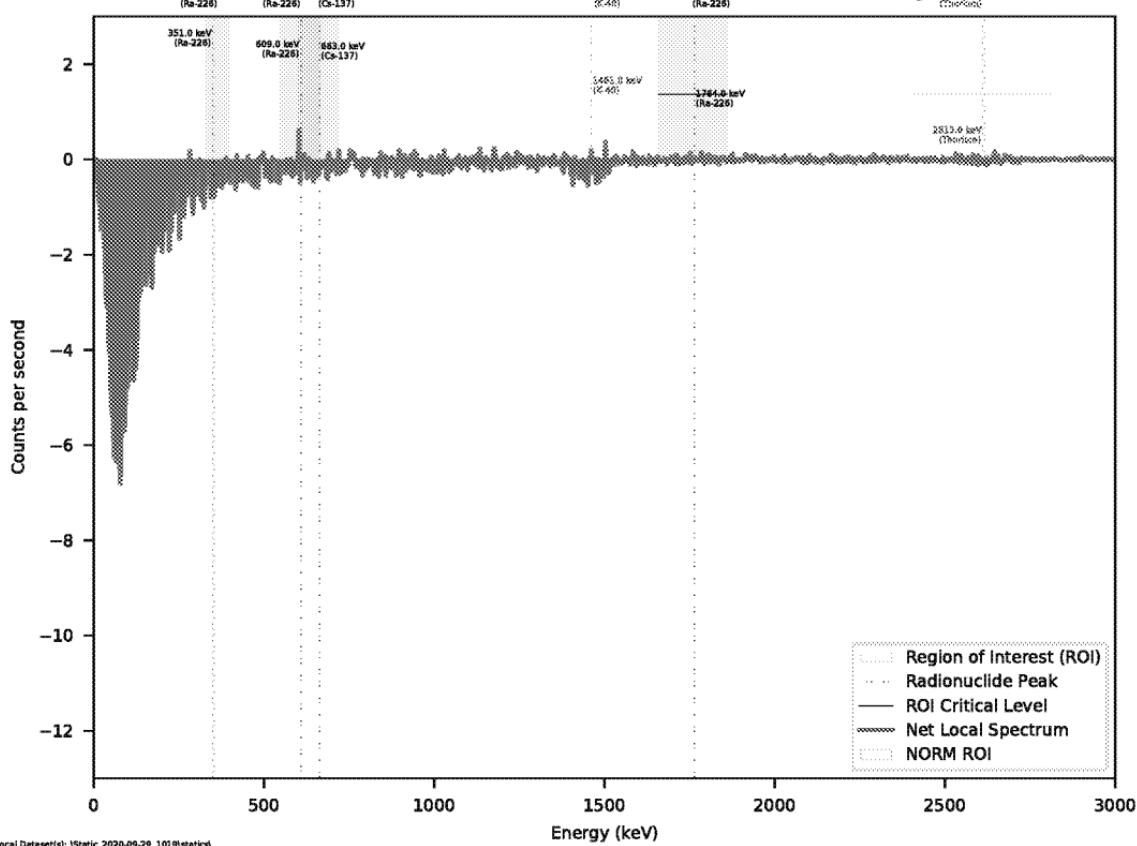
Net Gamma Spectrum, Static Location: 31

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Net Gamma Spectrum, Static Location: 32

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ED_006360A_00000168-00045



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-39695-1
Laboratory Sample Delivery Group: GJ46599788
Client Project/Site: HPNS-Parcel G 501197
Revision: 2

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
4/5/2021 4:49:41 PM
Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

LINKS

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Expert

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Job ID: 160-39695-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-39695-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- Added Pa234 to gamma target list

Revision 2- Additional information requested in case narrative for total strontium

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Job ID: 160-39695-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

RECEIPT

The samples were received on 10/01/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 17.0 C.

TOTAL BETA STRONTIUM (GFPC)

Samples HPPG-ESU-TU098A-001 (160-39695-1), HPPG-ESU-TU098A-011 (160-39695-11) and HPPG-ESU-TU098A-021 (160-39695-21) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 10/06/2020 and 10/07/2020, prepared on 10/14/2020 and analyzed on 10/31/2020.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP. HPPG-ESU-TU098A-001 (160-39695-1), HPPG-ESU-TU098A-011 (160-39695-11) and HPPG-ESU-TU098A-021 (160-39695-21)

The following sample(s) exhibited a negative result greater in magnitude than the 3 sigma TPU. This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required. HPPG-ESU-TU098A-021 (160-39695-21).

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-ESU-TU098A-001 (160-39695-1), HPPG-ESU-TU098A-002 (160-39695-2), HPPG-ESU-TU098A-003 (160-39695-3), HPPG-ESU-TU098A-004 (160-39695-4), HPPG-ESU-TU098A-005 (160-39695-5), HPPG-ESU-TU098A-006 (160-39695-6), HPPG-ESU-TU098A-007 (160-39695-7), HPPG-ESU-TU098A-008 (160-39695-8), HPPG-ESU-TU098A-009 (160-39695-9), HPPG-ESU-TU098A-010 (160-39695-10), HPPG-ESU-TU098A-011 (160-39695-11), HPPG-ESU-TU098A-012 (160-39695-12), HPPG-ESU-TU098A-013 (160-39695-13), HPPG-ESU-TU098A-014 (160-39695-14), HPPG-ESU-TU098A-015 (160-39695-15), HPPG-ESU-TU098A-016 (160-39695-16), HPPG-ESU-TU098A-017 (160-39695-17), HPPG-ESU-TU098A-018 (160-39695-18), HPPG-ESU-TU098A-019 (160-39695-19), HPPG-ESU-TU098A-020 (160-39695-20), HPPG-ESU-TU098A-021 (160-39695-21), HPPG-ESU-TU098A-022 (160-39695-22), HPPG-ESU-TU098A-023 (160-39695-23), HPPG-ESU-TU098A-024 (160-39695-24), HPPG-ESU-TU098A-025 (160-39695-25), HPPG-F-001 (160-39695-26) and HPPG-F-002 (160-39695-27) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/06/2020 and 10/07/2020, prepared on 10/13/2020 and 10/16/2020 and analyzed on 11/08/2020, 11/09/2020 and 11/10/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from Reported to Analyte

Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Job ID: 160-39695-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

Insufficient samples were provided for the following samples to fill a tuna can geometry calibrated for Ra-226 analysis by gamma spectroscopy: HPPG-ESU-TU098A-008 (160-39695-8), HPPG-ESU-TU098A-012 (160-39695-12), HPPG-ESU-TU098A-013 (160-39695-13), HPPG-ESU-TU098A-014 (160-39695-14), HPPG-ESU-TU098A-015 (160-39695-15), HPPG-ESU-TU098A-016 (160-39695-16), HPPG-ESU-TU098A-017 (160-39695-17), HPPG-ESU-TU098A-021 (160-39695-21), HPPG-ESU-TU098A-022 (160-39695-22), HPPG-ESU-TU098A-023 (160-39695-23), HPPG-ESU-TU098A-024 (160-39695-24), HPPG-ESU-TU098A-025 (160-39695-25), HPPG-F-002 (160-39695-27) and (160-39695-A-27-A DU). The use of a different geometry (100 mL solid) could potentially bias the results low due to the loss of radon into the headspace of the container.

Gamma Prep Batch 485411

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

The radium-226 detection goal of 0.2 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.
HPPG-ESU-TU098A-006 (160-39695-6)

Gamma Prep batch 485964

The cesium-137 detection goal of 0.0700 pCi/g was not met. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.
HPPG-ESU-TU098A-008 (160-39695-8), HPPG-ESU-TU098A-022 (160-39695-22) and HPPG-F-001 (160-39695-26).

The MB z-score for Bi-214/Ra-226 associated with Prep Batch 160-485964 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances. (MB 160-485964/1-A)

The replicate precision for Th-234/U-238 associated with Prep Batch 160-485029 and 160-485964 does not meet QC criteria. This appears to be random in nature, and limited deviations such as this are statistically expected when larger analyte lists are reported. Such excursions are often caused by fluctuations in Compton background, force-fitting of peaks that are not found by the software peak-search algorithm, and inclusion of inferior peak results by the software in weighted averages. The laboratory SOP allows for such statistical exceedances. (160-39695-A-27-F DU)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CHAIN OF CUSTODY

Ref. Document # 501197RSY-001

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Page 1 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-
0760
Address: 4005 Port Chicago
Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Murn

Project Number:	Analysis Requested										Dose Rate uR/Hr	Evidence Bag ID	Comment
	Total Strontium (EP-A 901:1/M) - Full 21 day Strontium (EP-A 905 M0D)												
Project Name:	Hunters Point Naval Shipyard: Parcel G Remedial Action												
Project Location:	San Francisco, CA												
Purchase Order #:	1159058												
Shipment/Pickup Date:	9/30/2020												
Waybill Number:	4957 0225 2050												
Lab Destination:	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046												
Lab Contact Name/ph #	Rhoeda Ridenbower (314)298-8566												
	MATRIX	# of Containers	Preservatives (water)	Preservatives (soil)	Container Type								

Sample ID	Collection Information				Method	Date	Time	Container Type	Preservatives (soil)	Preservatives (water)	# of Containers	# of Containers		
HPPG-ESU-TU098A-001		13:03	G	SO	1	9/28/2020	13:03	16 oz. plastic jar	X	X			5	GJ46599788
HPPG-ESU-TU098A-002		13:29	G	SO	1	9/28/2020	13:29	16 oz. plastic jar	X				5	GJ46599788
HPPG-ESU-TU098A-003		13:34	G	SO	1	9/28/2020	13:34	16 oz. plastic jar	X				5	GJ46599788
HPPG-ESU-TU098A-004		13:41	G	SO	1	9/28/2020	13:41	16 oz. plastic jar	X				4	GJ46599788
HPPG-ESU-TU098A-005		14:26	G	SO	1	9/28/2020	14:26	16 oz. plastic jar	X				5	GJ46599788
HPPG-ESU-TU098A-006		15:43	G	SO	1	9/28/2020	15:43	16 oz. plastic jar	X				5	GJ46599788
HPPG-ESU-TU098A-007		14:31	G	SO	1	9/28/2020	14:31	16 oz. plastic jar	X				5	GJ46599788
HPPG-ESU-TU098A-008		14:36	G	SO	1	9/28/2020	14:36	16 oz. plastic jar	X				5	GJ46599788

Special Instructions:

21 day ingrowth results only
Analyze for Total Strontium as a screening step, and Isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g

Turnaround Time:	3-day	10-Day	28-day	Other	Level of QC Required:	I	II	III	Project Specific
------------------	-------	--------	--------	-------	-----------------------	---	----	-----	------------------

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water ; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		09/28/2020 18:14	Locked Storage (RKilpack)		09/28/2020 18:14
Locked Storage (RKilpack)		09/30/2020 12:32	Joaquin Ramirez		09/30/2020 12:32
Joaquin Ramirez		09/30/2020 13:52	SHIPPEDTOLAB		

*** Last 3 transfers shown above - Complete list of transfers on last page ***



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APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Muri

Project Number:	Analysis Requested										Comment															
	Hunters Point Naval Shipyard: Parcel G Remedial Action																									
Project Location:	San Francisco, CA		Purchase Order #:	1159058		Shipment/Pickup Date:	9/30/2020		Waybill Number:	H957 0225 2050		Lab Destination:	Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046		Total Submission (EPA 905 M0D)	Ceramic Spec (EPA 901.1M) - Unit 21		Day in Sample Gamma (EPA 905 M0D)	Preservatives (water)		Dose Rate (R/Hr)	Evidence Bag ID				
Lab Contact Name/ph #	Rhoeda Ridenbower (314)298-8566		Metric	# of Containers	Preservatives (soil)		Container Type																			
Sample ID	Date	Time	Method	Matrix	# of Containers	Preservatives (soil)		Container Type																		
HPPG-ESU-TU098A-009	9/28/2020	14:43	G	SO	1	16 oz. plastic jar		X												4	GJ46599788					
HPPG-ESU-TU098A-010	9/28/2020	14:48	G	SO	1	16 oz. plastic jar		X												4	GJ46599788					
HPPG-ESU-TU098A-011	9/28/2020	14:53	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-012	9/28/2020	15:02	G	SO	1	16 oz. plastic jar		X												4	GJ46599788					
HPPG-ESU-TU098A-013	9/28/2020	15:06	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-014	9/28/2020	15:14	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-015	9/28/2020	15:19	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-016	9/28/2020	15:22	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-017	9/28/2020	15:25	G	SO	1	16 oz. plastic jar		X												4	GJ46599788					
HPPG-ESU-TU098A-018	9/28/2020	15:28	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-019	9/28/2020	15:47	G	SO	1	16 oz. plastic jar		X												4	GJ46599788					
HPPG-ESU-TU098A-020	9/28/2020	15:49	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-021	9/28/2020	15:51	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-022	9/28/2020	15:55	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-023	9/28/2020	16:07	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					
HPPG-ESU-TU098A-024	9/28/2020	16:28	G	SO	1	16 oz. plastic jar		X												4	GJ46599788					
HPPG-ESU-TU098A-025	9/28/2020	16:39	G	SO	1	16 oz. plastic jar		X												5	GJ46599788					

2020



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Ref. Document # 501197RSY-001

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APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Murri

Project Number: 501197

Hunters Point Naval Shipyard: Parcel

Project Name: G Remedial Action

Project Location: San Francisco, CA

Purchase Order #: 1159058

Shipment/Pickup Date: 9/30/2020

Waybill Number: 4957 0225 2050

Lab Destination: Test America (St. Louis Lab)
13715 Rider Trail North
Earth City, MO 63046

Lab Contact Name/ph #

Rhoeda Ridenbower (314)298-8566

	Collection Information				Analysis Requested						Dose Rate μR/Hr	Evidence Bag ID	Comment
Sample ID	Date	Time	Method	Matrix	# of Containers	Preservatives (water)	Preservatives (soil)	Container Type	Total Solubility (EPA 905 M0D)	Carrene Spec (EPA 901.1 M) - Full 21	day in growth medium	Comments	
HPPG-F-001	9/28/2020	15:43	G	SO	1	16 oz. plastic jar		X				5	GJ46599788
HPPG-F-002	9/28/2020	16:28	G	SO	1	16 oz. plastic jar		X				4	GJ46599788

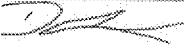
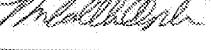
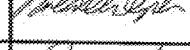
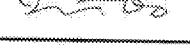
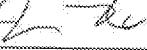
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All Transfers for COC 501197RSY-001

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Lewis, Devin		09/28/2020 18:14	Locked Storage (RKillpack)		09/28/2020 18:14
Locked Storage (RKillpack)		09/30/2020 12:32	Joaquin Ramirez		09/30/2020 12:32
Joaquin Ramirez		09/30/2020 13:52	SHIPPEDTOLAB		





CHAIN OF CUSTODY

Ref. Document # 501197RSY-001

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APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Murri

Lab Contact Name/Ph #	Collection Information				Preservatives (water)	Preservatives (soil)	Container Type	# of Containers	Matrix	Total Strontium (EP-A 905 MDD) - Full 21 day ingrowth Gamma	Chemical Spec (EPA 901-1 M) - Full 21 day ingrowth Gamma	Analysis Requested			
HPPG-ESU-TU098A-001	9/28/2020	13:03	G	SO	1	16 oz. plastic jar	X	X				5	GJ46599788		
HPPG-ESU-TU098A-002	9/28/2020	13:29	G	SO	1	16 oz. plastic jar	X					5	GJ46599788		
HPPG-ESU-TU098A-003	9/28/2020	13:34	G	SO	1	16 oz. plastic jar	X					5	GJ46599788		
HPPG-ESU-TU098A-004	9/28/2020	13:41	G	SO	1	16 oz. plastic jar	X					4	GJ46599788		
HPPG-ESU-TU098A-005	9/28/2020	14:26	G	SO	1	16 oz. plastic jar	X					5	GJ46599788		
HPPG-ESU-TU098A-006	9/28/2020	15:43	G	SO	1	16 oz. plastic jar	X					5	GJ46599788		
HPPG-ESU-TU098A-007	9/28/2020	14:31	G	SO	1	16 oz. plastic jar	X					5	GJ46599788		
HPPG-ESU-TU098A-008	9/28/2020	14:36	G	SO	1	16 oz. plastic jar	X					5	GJ46599788		

Special Instructions:

21 day ingrowth results only

Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g

Turnaround Time:	3-day <input type="checkbox"/>	10-Day <input type="checkbox"/>	28-day <input type="checkbox"/>	Other <input type="checkbox"/>	Level of QC Required:	I <input type="checkbox"/>	II <input type="checkbox"/>	III <input type="checkbox"/>	Project Specific
------------------	--------------------------------	---------------------------------	---------------------------------	--------------------------------	-----------------------	----------------------------	-----------------------------	------------------------------	------------------

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; SO = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		09/28/2020 18:14	Locked Storage (RKillpack)		09/28/2020 18:14
Locked Storage (RKillpack)		09/30/2020 12:32	Joaquin Ramirez		09/30/2020 12:32
Joaquin Ramirez		09/30/2020 13:52	SHIPPED TO LAB		10/1/2020 09:30

*** Last 3 transfers shown above - Complete list of transfers on last page ***



ED_006360A_00000168-00055



CHAIN OF CUSTODY

Ref. Document # 501197RSY-001

Page 2 of 4

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Muri

				Project Number: 501197		Analysis Requested						Dose Rate mR/Hr	Evidence Bag ID	Comment			
				Hunters Point Naval Shipyard Parcel Project Name: G Remedial Action													
				Project Location: San Francisco, CA													
				Purchase Order #: 1159058													
				Shipment/Pickup Date: 9/30/2020													
				Waybill Number: 4957 0225 2650													
				Lab Destination: Test America (St. Louis Lab) 13715 Rider Trail North Earth City, MO 63046													
				Lab Contact Name/ph #													
				Rhoeda Ridenbower (314)298-8566													



APTM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520

CHAIN OF CUSTODY

Ref. Document # 501197RSY-001

Page 3 of 4

Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy
City: Concord, CA 94520

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez
Andrew Murri

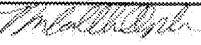
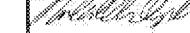
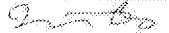
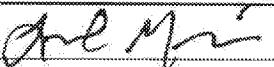
Collection Information				Analysis Requested									
Sample ID	Date	Time	Method	Matrix	# of Containers	Preservatives (water)	Preservatives (soil)	Container Type	Total Sample (EPA 9011-N) - Full 21	Carryover Sample (EPA 9011-N) - Full 20	Dose Rate mR/Hr	Evidence Bag ID	Comment
HPPG-F-001	9/28/2020	16:43	G	SO	1	16 oz. plastic jar		X			5	GJ46599788	
HPPG-F-002	9/28/2020	16:28	G	SO	1	16 oz. plastic jar		X			4	GJ46599788	



ED_006360A_00000168-00057

All Transfers for COC 501197RSY-001

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Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		09/28/2020 18:14	Locked Storage (RKillpack)		09/28/2020 18:14
Locked Storage (RKillpack)		09/30/2020 12:32	Joaquin Ramirez		09/30/2020 12:32
Joaquin Ramirez		09/30/2020 13:52	SHIPPEDTOLAB		10/12/20 0930

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-39695-1
SDG Number: GJ46599788**Login Number:** 39695**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-39695-1	HPPG-ESU-TU098A-001	Solid	09/28/20 13:03	10/01/20 09:30	
160-39695-2	HPPG-ESU-TU098A-002	Solid	09/28/20 13:29	10/01/20 09:30	
160-39695-3	HPPG-ESU-TU098A-003	Solid	09/28/20 13:34	10/01/20 09:30	
160-39695-4	HPPG-ESU-TU098A-004	Solid	09/28/20 13:41	10/01/20 09:30	
160-39695-5	HPPG-ESU-TU098A-005	Solid	09/28/20 14:26	10/01/20 09:30	
160-39695-6	HPPG-ESU-TU098A-006	Solid	09/28/20 15:43	10/01/20 09:30	
160-39695-7	HPPG-ESU-TU098A-007	Solid	09/28/20 14:31	10/01/20 09:30	
160-39695-8	HPPG-ESU-TU098A-008	Solid	09/28/20 14:36	10/01/20 09:30	
160-39695-9	HPPG-ESU-TU098A-009	Solid	09/28/20 14:43	10/01/20 09:30	
160-39695-10	HPPG-ESU-TU098A-010	Solid	09/28/20 14:48	10/01/20 09:30	
160-39695-11	HPPG-ESU-TU098A-011	Solid	09/28/20 14:53	10/01/20 09:30	
160-39695-12	HPPG-ESU-TU098A-012	Solid	09/28/20 15:02	10/01/20 09:30	
160-39695-13	HPPG-ESU-TU098A-013	Solid	09/28/20 15:06	10/01/20 09:30	
160-39695-14	HPPG-ESU-TU098A-014	Solid	09/28/20 15:14	10/01/20 09:30	
160-39695-15	HPPG-ESU-TU098A-015	Solid	09/28/20 15:19	10/01/20 09:30	
160-39695-16	HPPG-ESU-TU098A-016	Solid	09/28/20 15:22	10/01/20 09:30	
160-39695-17	HPPG-ESU-TU098A-017	Solid	09/28/20 15:25	10/01/20 09:30	
160-39695-18	HPPG-ESU-TU098A-018	Solid	09/28/20 15:28	10/01/20 09:30	
160-39695-19	HPPG-ESU-TU098A-019	Solid	09/28/20 15:47	10/01/20 09:30	
160-39695-20	HPPG-ESU-TU098A-020	Solid	09/28/20 15:49	10/01/20 09:30	
160-39695-21	HPPG-ESU-TU098A-021	Solid	09/28/20 15:51	10/01/20 09:30	
160-39695-22	HPPG-ESU-TU098A-022	Solid	09/28/20 15:55	10/01/20 09:30	
160-39695-23	HPPG-ESU-TU098A-023	Solid	09/28/20 16:07	10/01/20 09:30	
160-39695-24	HPPG-ESU-TU098A-024	Solid	09/28/20 16:28	10/01/20 09:30	
160-39695-25	HPPG-ESU-TU098A-025	Solid	09/28/20 16:39	10/01/20 09:30	
160-39695-26	HPPG-F-001	Solid	09/28/20 15:43	10/01/20 09:30	
160-39695-27	HPPG-F-002	Solid	09/28/20 16:28	10/01/20 09:30	

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-001

Lab Sample ID: 160-39695-1

Matrix: Solid

Date Collected: 09/28/20 13:03
Date Received: 10/01/20 09:30

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.0468	U	0.0782	0.0783	0.160	0.0677	pCi/g	10/14/20 12:28	10/31/20 10:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	77.6		40 - 110					10/14/20 12:28	10/31/20 10:47	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0573	U	0.241	0.242		0.276	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Actinium 228	0.387		0.118	0.125		0.0262	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Bismuth-212	0.267	U	0.453	0.454		0.336	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Bismuth-214	-0.110	U	0.0820	0.0828		0.193	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Cesium-137	0.0259	U	0.0472	0.0473	0.0700	0.0361	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Lead-210	-0.708	U	1.26	1.26		1.06	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Lead-212	0.235		0.0748	0.0807		0.0439	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Lead-214	0.299		0.107	0.112		0.0606	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Potassium-40	7.31		1.18	1.40		0.268	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Protactinium-231	-0.661	U	2.37	2.37		1.93	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Protactinium-234	0.0952	U	0.0719	0.0726		0.145	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Radium-226	-0.110	U	0.0820	0.0828	0.200	0.193	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Radium-228	0.387		0.118	0.125		0.0262	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thallium-208	0.104		0.0549	0.0560		0.0246	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thorium-232	0.387		0.118	0.125		0.0262	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thorium-234	0.149	U	0.435	0.435		0.347	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thorium 228	0.235		0.0748	0.0807		0.0439	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Uranium-235	0.155	U	0.142	0.143		0.247	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Uranium-238	0.149	U	0.435	0.435		0.347	pCi/g	10/13/20 17:37	11/08/20 19:27	1

Client Sample ID: HPPG-ESU-TU098A-002

Lab Sample ID: 160-39695-2

Matrix: Solid

Date Collected: 09/28/20 13:29
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.198	U	0.0935	0.0957		0.335	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Actinium 228	0.431		0.198	0.203		0.142	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Bismuth-212	0.000	U	0.461	0.461		0.701	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Bismuth-214	0.532		0.160	0.169		0.0552	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Cesium-137	0.0258	U	0.0609	0.0610	0.0700	0.0471	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Lead-210	0.885	U	1.49	1.49		1.01	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Lead-212	0.451		0.0917	0.103		0.0407	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Lead-214	0.481		0.130	0.139		0.0499	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Potassium-40	8.56		1.54	1.77		0.235	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Protactinium-231	0.000	U	0.948	0.948		2.14	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Protactinium-234	-0.0988	U	0.306	0.306		0.249	pCi/g	10/13/20 17:37	11/08/20 19:29	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-002

Lab Sample ID: 160-39695-2

Matrix: Solid

Date Collected: 09/28/20 13:29
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-226	0.532		0.160	0.169	0.200	0.0552	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Radium-228	0.431		0.198	0.203		0.142	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Thallium-208	0.156		0.0751	0.0767		0.0333	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Thorium-232	0.431		0.198	0.203		0.142	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Thorium-234	0.366	U	0.504	0.506		0.391	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Thorium 228	0.451		0.0917	0.103		0.0407	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Uranium-235	0.0767	U	0.561	0.561		0.460	pCi/g	10/13/20 17:37	11/08/20 19:29	1
Uranium-238	0.366	U	0.504	0.506		0.391	pCi/g	10/13/20 17:37	11/08/20 19:29	1

Client Sample ID: HPPG-ESU-TU098A-003

Lab Sample ID: 160-39695-3

Matrix: Solid

Date Collected: 09/28/20 13:34
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.0859	U	0.247	0.248		0.200	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Actinium 228	0.402		0.108	0.116		0.0193	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Bismuth-212	0.151	U	0.355	0.356		0.274	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Bismuth-214	0.214		0.0760	0.0792		0.0347	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Cesium-137	0.0184	U	0.0338	0.0339	0.0700	0.0258	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Lead-210	0.424	U	0.779	0.780		0.613	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Lead-212	0.287		0.0560	0.0672		0.0224	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Lead-214	0.279		0.0658	0.0719		0.0375	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Potassium-40	7.24		0.972	1.22		0.0760	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Protactinium-231	0.000	U	0.377	0.377		1.46	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Protactinium-234	-0.0744	U	0.209	0.209		0.170	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Radium-226	0.214		0.0760	0.0792	0.200	0.0347	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Radium-228	0.402		0.108	0.116		0.0193	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Thallium-208	0.0344		0.0570	0.0571		0.0227	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Thorium-232	0.402		0.108	0.116		0.0193	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Thorium-234	-0.311	U	1.06	1.06		0.866	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Thorium 228	0.287		0.0560	0.0672		0.0224	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Uranium-235	0.0315	U	0.0820	0.0821		0.297	pCi/g	10/13/20 17:37	11/08/20 20:00	1
Uranium-238	-0.311	U	1.06	1.06		0.866	pCi/g	10/13/20 17:37	11/08/20 20:00	1

Client Sample ID: HPPG-ESU-TU098A-004

Lab Sample ID: 160-39695-4

Matrix: Solid

Date Collected: 09/28/20 13:41
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.124	U	0.444	0.444		0.344	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Actinium 228	0.523		0.175	0.183		0.102	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Bismuth-212	-0.255	U	0.824	0.824		0.655	pCi/g	10/13/20 17:37	11/08/20 20:01	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-004
Date Collected: 09/28/20 13:41
Date Received: 10/01/20 09:30

Lab Sample ID: 160-39695-4
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.369		0.137	0.142		0.0708	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Cesium-137	-0.0352	U	0.0818	0.0819	0.0700	0.0647	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Lead-210	-0.989	U	1.73	1.73		1.47	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Lead-212	0.469		0.0898	0.102		0.0335	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Lead-214	0.538		0.126	0.138		0.0515	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Potassium-40	9.25		1.41	1.69		0.125	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Protactinium-231	0.000	U	0.387	0.387		2.10	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Protactinium-234	-0.111	U	0.338	0.338		0.275	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Radium-226	0.369		0.137	0.142	0.200	0.0708	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Radium-228	0.523		0.175	0.183		0.102	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Thallium-208	0.172		0.0535	0.0563		0.0134	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Thorium-232	0.523		0.175	0.183		0.102	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Thorium-234	-0.855	U	0.755	0.761		0.645	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Thorium 228	0.469		0.0898	0.102		0.0335	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Uranium-235	-0.188	U	0.564	0.565		0.459	pCi/g	10/13/20 17:37	11/08/20 20:01	1
Uranium-238	-0.855	U	0.755	0.761		0.645	pCi/g	10/13/20 17:37	11/08/20 20:01	1

Client Sample ID: HPPG-ESU-TU098A-005

Lab Sample ID: 160-39695-5

Matrix: Solid

Date Collected: 09/28/20 14:26

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.203	U	0.399	0.400		0.227	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Actinium 228	0.417		0.130	0.137		0.0650	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Bismuth-212	0.000	U	0.360	0.360		0.492	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Bismuth-214	0.334		0.0952	0.101		0.0467	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Cesium-137	0.0228	U	0.0456	0.0456	0.0700	0.0353	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Lead-210	0.462	U	0.883	0.885		0.695	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Lead-212	0.368		0.0731	0.0872		0.0331	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Lead-214	0.304		0.0778	0.0839		0.0438	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Potassium-40	6.62		1.06	1.26		0.255	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Protactinium-231	-0.738	U	2.25	2.26		1.83	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Protactinium-234	-0.0886	U	0.253	0.253		0.206	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Radium-226	0.334		0.0952	0.101	0.200	0.0467	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Radium-228	0.417		0.130	0.137		0.0650	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Thallium-208	0.130		0.0442	0.0462		0.0158	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Thorium-232	0.417		0.130	0.137		0.0650	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Thorium-234	0.154	U	0.612	0.612		0.706	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Thorium 228	0.368		0.0731	0.0872		0.0331	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Uranium-235	0.000	U	0.119	0.119		0.384	pCi/g	10/13/20 17:37	11/08/20 20:02	1
Uranium-238	0.154	U	0.612	0.612		0.706	pCi/g	10/13/20 17:37	11/08/20 20:02	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-006

Lab Sample ID: 160-39695-6

Matrix: Solid

Date Collected: 09/28/20 15:43
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0969	U	0.294	0.295		0.278	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Actinium 228	0.150		0.135	0.136		0.129	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Bismuth-212	0.346	U	0.793	0.794		0.612	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Bismuth-214	0.0997	U	0.114	0.115		0.212	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Cesium-137	-0.0450	U	0.154	0.154	0.0700	0.0650	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Lead-210	0.554	U	1.05	1.05		0.717	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Lead-212	0.294		0.0829	0.0912		0.0394	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Lead-214	0.291		0.114	0.118		0.0554	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Potassium-40	6.80		1.44	1.60		0.278	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Protactinium-231	0.551	U	1.68	1.68		1.84	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Protactinium-234	0.00953	U	0.0207	0.0208		0.143	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Radium-226	0.0997	U	0.114	0.115	0.200	0.212	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Radium-228	0.150		0.135	0.136		0.129	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thallium-208	0.0939		0.0925	0.0930		0.0397	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thorium-232	0.150		0.135	0.136		0.129	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thorium-234	-0.399	U	0.657	0.659		0.795	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thorium 228	0.294		0.0829	0.0912		0.0394	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Uranium-235	0.179		0.183	0.184		0.101	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Uranium-238	-0.399	U	0.657	0.659		0.795	pCi/g	10/13/20 17:37	11/08/20 20:03	1

Client Sample ID: HPPG-ESU-TU098A-007

Lab Sample ID: 160-39695-7

Matrix: Solid

Date Collected: 09/28/20 14:31
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0942	U	0.408	0.409		0.249	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Actinium 228	0.386		0.143	0.148		0.0248	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Bismuth-212	-0.474	U	0.805	0.806		0.629	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Bismuth-214	0.296		0.0965	0.101		0.0329	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Cesium-137	-0.0113	U	0.0649	0.0649	0.0700	0.0527	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Lead-210	0.378	U	0.981	0.982		0.770	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Lead-212	0.292		0.0747	0.0837		0.0399	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Lead-214	0.238		0.0886	0.0920		0.0445	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Potassium-40	6.81		1.11	1.31		0.254	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Protactinium-231	-0.746	U	2.66	2.66		2.17	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Protactinium-234	0.131	U	0.129	0.130		0.147	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Radium-226	0.296		0.0965	0.101	0.200	0.0329	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Radium-228	0.386		0.143	0.148		0.0248	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thallium-208	0.0871		0.0354	0.0365		0.0157	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thorium-232	0.386		0.143	0.148		0.0248	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thorium-234	-0.412	U	0.727	0.728		0.626	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Thorium 228	0.292		0.0747	0.0837		0.0399	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Uranium-235	0.172		0.223	0.224		0.150	pCi/g	10/13/20 17:37	11/08/20 20:03	1
Uranium-238	-0.412	U	0.727	0.728		0.626	pCi/g	10/13/20 17:37	11/08/20 20:03	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-008
Date Collected: 09/28/20 14:36
Date Received: 10/01/20 09:30

Lab Sample ID: 160-39695-8
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.107	U	0.564	0.564		0.347	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Actinium 228	0.113	U	0.245	0.245		0.144	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Bismuth-212	1.13		0.500	0.513		0.157	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Bismuth-214	0.258		0.132	0.134		0.0730	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Cesium-137	-0.0617	U	0.103	0.103	0.0700	0.0813	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Lead-210	0.728	U	1.12	1.13		0.734	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Lead-212	0.327		0.0843	0.0909		0.0475	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Lead-214	0.321		0.115	0.119		0.0619	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Potassium-40	8.04		1.24	1.49		0.112	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Protactinium-231	0.392	U	1.47	1.47		2.32	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Protactinium-234	0.142	U	0.268	0.268		0.207	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Radium-226	0.258		0.132	0.134	0.200	0.0730	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Radium-228	0.113	U	0.245	0.245		0.144	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Thallium-208	0.162		0.0595	0.0618		0.0237	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Thorium-232	0.113	U	0.245	0.245		0.144	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Thorium-234	0.590		0.591	0.595		0.452	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Thorium 228	0.327		0.0843	0.0909		0.0475	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Uranium-235	0.101	U	0.195	0.195		0.397	pCi/g	10/16/20 13:49	11/09/20 20:25	1
Uranium-238	0.590		0.591	0.595		0.452	pCi/g	10/16/20 13:49	11/09/20 20:25	1

Client Sample ID: HPPG-ESU-TU098A-009

Date Collected: 09/28/20 14:43

Date Received: 10/01/20 09:30

Lab Sample ID: 160-39695-9

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.255	U	0.557	0.557		0.334	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Actinium 228	0.500		0.153	0.161		0.0326	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Bismuth-212	0.347	U	0.787	0.787		0.614	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Bismuth-214	0.378		0.157	0.162		0.0726	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Cesium-137	-0.0479	U	0.0811	0.0813	0.0700	0.0630	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Lead-210	0.319	U	1.38	1.38		1.10	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Lead-212	0.418		0.0836	0.0942		0.0284	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Lead-214	0.315		0.126	0.130		0.101	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Potassium-40	6.51		1.19	1.36		0.126	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Protactinium-231	0.000	U	0.248	0.248		2.20	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Protactinium-234	0.0205	U	0.0362	0.0363		0.255	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Radium-226	0.378		0.157	0.162	0.200	0.0726	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Radium-228	0.500		0.153	0.161		0.0326	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Thallium-208	0.121		0.0481	0.0496		0.0144	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Thorium-232	0.500		0.153	0.161		0.0326	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Thorium-234	-0.186	U	1.11	1.11		0.922	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Thorium 228	0.418		0.0836	0.0942		0.0284	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Uranium-235	-0.0982	U	0.310	0.310		0.517	pCi/g	10/16/20 13:49	11/09/20 15:14	1
Uranium-238	-0.186	U	1.11	1.11		0.922	pCi/g	10/16/20 13:49	11/09/20 15:14	1

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Client Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-39695-1
 SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-010
Lab Sample ID: 160-39695-10

Date Collected: 09/28/20 14:48

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.320	U	0.729	0.729		0.413	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Actinium 228	0.744		0.189	0.204		0.0406	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Bismuth-212	0.388	U	0.733	0.734		0.554	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Bismuth-214	0.618		0.175	0.186		0.0692	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Cesium-137	-0.0323	U	0.0615	0.0616	0.0700	0.0577	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Lead-210	-0.721	U	1.91	1.91		1.60	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Lead-212	0.703		0.110	0.133		0.0393	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Lead-214	0.518		0.131	0.141		0.0673	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Potassium-40	10.7		1.78	2.08		0.252	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Protactinium-231	0.000	U	0.524	0.524		2.66	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Protactinium-234	-0.104	U	0.325	0.326		0.265	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Radium-226	0.618		0.175	0.186	0.200	0.0692	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Radium-228	0.744		0.189	0.204		0.0406	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Thallium-208	0.237		0.0717	0.0757		0.0207	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Thorium-232	0.744		0.189	0.204		0.0406	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Thorium-234	0.623		0.660	0.664		0.508	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Thorium 228	0.703		0.110	0.133		0.0393	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Uranium-235	0.0117	U	0.0221	0.0221		0.298	pCi/g	10/16/20 13:49	11/09/20 15:38	1
Uranium-238	0.623		0.660	0.664		0.508	pCi/g	10/16/20 13:49	11/09/20 15:38	1

Client Sample ID: HPPG-ESU-TU098A-011
Lab Sample ID: 160-39695-11

Date Collected: 09/28/20 14:53

Matrix: Solid

Date Received: 10/01/20 09:30

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Total Beta Strontium	0.0522	U	0.0748	0.0749	0.160	0.0574	pCi/g	10/14/20 12:28	10/31/20 10:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	78.4		40 - 110					10/14/20 12:28	10/31/20 10:48	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.266	U	0.536	0.537		0.310	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Actinium 228	0.196		0.179	0.180		0.106	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Bismuth-212	-0.0409	U	0.544	0.544		0.444	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Bismuth-214	0.343		0.0941	0.101		0.0379	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Cesium-137	0.0135	U	0.0513	0.0513	0.0700	0.0411	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Lead-210	0.445	U	0.876	0.878		0.691	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Lead-212	0.260		0.0640	0.0723		0.0324	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Lead-214	0.266		0.0914	0.0955		0.0421	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Potassium-40	6.34		1.02	1.21		0.245	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Protactinium-231	0.558	U	1.37	1.37		1.51	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Protactinium-234	0.110	U	0.0778	0.0786		0.154	pCi/g	10/16/20 13:49	11/09/20 16:07	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-011

Lab Sample ID: 160-39695-11

Date Collected: 09/28/20 14:53

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-226	0.343		0.0941	0.101	0.200	0.0379	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Radium-228	0.196		0.179	0.180		0.106	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Thallium-208	0.0360		0.0755	0.0756		0.0338	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Thorium-232	0.196		0.179	0.180		0.106	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Thorium-234	0.254		0.362	0.363		0.220	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Thorium 228	0.260		0.0640	0.0723		0.0324	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Uranium-235	0.0104 U		0.0182	0.0182		0.286	pCi/g	10/16/20 13:49	11/09/20 16:07	1
Uranium-238	0.254		0.362	0.363		0.220	pCi/g	10/16/20 13:49	11/09/20 16:07	1

Client Sample ID: HPPG-ESU-TU098A-012

Lab Sample ID: 160-39695-12

Date Collected: 09/28/20 15:02

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.137 U		0.282	0.282		0.278	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Actinium 228	0.744		0.187	0.202		0.0705	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Bismuth-212	-0.581 U		1.17	1.17		0.925	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Bismuth-214	0.545		0.150	0.160		0.0598	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Cesium-137	0.0182 U		0.0540	0.0540	0.0700	0.0420	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Lead-210	0.0716 U		1.02	1.02		0.694	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Lead-212	0.384		0.0860	0.0949		0.0425	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Lead-214	0.279		0.121	0.124		0.0615	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Potassium-40	7.30		1.41	1.59		0.311	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Protactinium-231	0.521 U		1.77	1.77		1.94	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Protactinium-234	0.0541 U		0.105	0.105		0.219	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Radium-226	0.545		0.150	0.160	0.200	0.0598	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Radium-228	0.744		0.187	0.202		0.0705	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Thallium-208	0.144		0.0530	0.0550		0.0184	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Thorium-232	0.744		0.187	0.202		0.0705	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Thorium-234	-0.672 U		0.845	0.848		0.710	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Thorium 228	0.384		0.0860	0.0949		0.0425	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Uranium-235	0.0178 U		0.0477	0.0477		0.398	pCi/g	10/16/20 13:49	11/09/20 17:18	1
Uranium-238	-0.672 U		0.845	0.848		0.710	pCi/g	10/16/20 13:49	11/09/20 17:18	1

Client Sample ID: HPPG-ESU-TU098A-013

Lab Sample ID: 160-39695-13

Date Collected: 09/28/20 15:06

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.0404 U		0.0858	0.0859		0.283	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Actinium 228	0.349		0.157	0.161		0.0695	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Bismuth-212	0.000 U		0.386	0.386		0.546	pCi/g	10/16/20 13:49	11/09/20 17:19	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-013
Date Collected: 09/28/20 15:06
Date Received: 10/01/20 09:30

Lab Sample ID: 160-39695-13
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.365		0.105	0.112		0.0481	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Cesium-137	-0.0144	U	0.0592	0.0592	0.0700	0.0478	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Lead-210	-0.0181	U	0.816	0.816		0.671	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Lead-212	0.277		0.0645	0.0707		0.0338	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Lead-214	0.327		0.0995	0.105		0.0502	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Potassium-40	7.63		1.12	1.36		0.328	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Protactinium-231	0.566	U	1.59	1.59		1.73	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Protactinium-234	0.0248	U	0.0428	0.0428		0.190	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Radium-226	0.365		0.105	0.112	0.200	0.0481	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Radium-228	0.349		0.157	0.161		0.0695	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Thallium-208	0.0613		0.0767	0.0769		0.0345	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Thorium-232	0.349		0.157	0.161		0.0695	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Thorium-234	-0.0243	U	0.378	0.378		0.739	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Thorium-228	0.277		0.0645	0.0707		0.0338	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Uranium-235	0.000	U	0.132	0.132		0.363	pCi/g	10/16/20 13:49	11/09/20 17:19	1
Uranium-238	-0.0243	U	0.378	0.378		0.739	pCi/g	10/16/20 13:49	11/09/20 17:19	1

Client Sample ID: HPPG-ESU-TU098A-014

Lab Sample ID: 160-39695-14

Date Collected: 09/28/20 15:14
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.159	U	0.588	0.588		0.360	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Actinium 228	0.596		0.257	0.264		0.134	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Bismuth-212	-0.299	U	1.05	1.05		0.848	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Bismuth-214	0.445		0.143	0.150		0.0694	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Cesium-137	-0.00104	U	0.0644	0.0644	0.0700	0.0530	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Lead-210	0.765		0.988	0.993		0.656	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Lead-212	0.498		0.0866	0.101		0.0380	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Lead-214	0.478		0.142	0.150		0.0669	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Potassium-40	10.3		1.45	1.79		0.234	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Protactinium-231	-0.969	U	3.23	3.23		2.63	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Protactinium-234	-0.00634	U	0.0173	0.0173		0.262	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Radium-226	0.445		0.143	0.150	0.200	0.0694	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Radium-228	0.596		0.257	0.264		0.134	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Thallium-208	0.179		0.0702	0.0725		0.0310	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Thorium-232	0.596		0.257	0.264		0.134	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Thorium-234	-1.21	U	0.675	0.689		0.885	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Thorium 228	0.498		0.0866	0.101		0.0380	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Uranium-235	0.263		0.219	0.221		0.120	pCi/g	10/16/20 13:49	11/09/20 17:21	1
Uranium-238	-1.21	U	0.675	0.689		0.885	pCi/g	10/16/20 13:49	11/09/20 17:21	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-015

Lab Sample ID: 160-39695-15

Matrix: Solid

Date Collected: 09/28/20 15:19
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0142	U	0.0290	0.0291		0.337	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Actinium 228	0.611		0.152	0.164		0.0429	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Bismuth-212	-0.432	U	0.758	0.760		0.597	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Bismuth-214	0.404		0.131	0.137		0.0642	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Cesium-137	0.0235	U	0.0457	0.0457	0.0700	0.0355	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Lead-210	-0.197	U	0.814	0.814		0.663	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Lead-212	0.551		0.0821	0.109		0.0353	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Lead-214	0.443		0.0967	0.107		0.0566	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Potassium-40	8.68		1.12	1.43		0.0847	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Protactinium-231	-0.720	U	2.43	2.43		1.98	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Protactinium-234	-0.0929	U	0.254	0.254		0.207	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Radium-226	0.404		0.131	0.137	0.200	0.0642	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Radium-228	0.611		0.152	0.164		0.0429	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Thallium-208	0.166		0.0468	0.0498		0.0166	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Thorium-232	0.611		0.152	0.164		0.0429	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Thorium-234	-0.331	U	1.04	1.04		0.847	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Thorium 228	0.551		0.0821	0.109		0.0353	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Uranium-235	0.000	U	0.186	0.186		0.369	pCi/g	10/16/20 13:49	11/09/20 17:22	1
Uranium-238	-0.331	U	1.04	1.04		0.847	pCi/g	10/16/20 13:49	11/09/20 17:22	1

Client Sample ID: HPPG-ESU-TU098A-016

Lab Sample ID: 160-39695-16

Matrix: Solid

Date Collected: 09/28/20 15:22
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0403	U	0.711	0.711		0.442	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Actinium 228	0.382		0.252	0.255		0.131	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Bismuth-212	0.000	U	0.397	0.397		0.758	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Bismuth-214	0.342		0.146	0.150		0.0905	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Cesium-137	0.0292	U	0.0753	0.0753	0.0700	0.0597	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Lead-210	1.26		1.19	1.21		0.765	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Lead-212	0.617		0.111	0.128		0.0542	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Lead-214	0.538		0.127	0.138		0.0806	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Potassium-40	9.88		1.52	1.82		0.434	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Protactinium-231	0.738	U	2.25	2.25		2.46	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Protactinium-234	0.0164	U	0.0713	0.0713		0.292	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Radium-226	0.342		0.146	0.150	0.200	0.0905	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Radium-228	0.382		0.252	0.255		0.131	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Thallium-208	0.201		0.108	0.110		0.0514	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Thorium-232	0.382		0.252	0.255		0.131	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Thorium-234	1.23		0.767	0.780		0.493	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Thorium 228	0.617		0.111	0.128		0.0542	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Uranium-235	0.000	U	0.255	0.255		0.513	pCi/g	10/16/20 13:49	11/09/20 17:23	1
Uranium-238	1.23		0.767	0.780		0.493	pCi/g	10/16/20 13:49	11/09/20 17:23	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-017

Lab Sample ID: 160-39695-17

Matrix: Solid

Date Collected: 09/28/20 15:25
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0184	U	0.0338	0.0339		0.293	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Actinium 228	0.428		0.157	0.163		0.123	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Bismuth-212	0.183	U	0.539	0.540		0.429	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Bismuth-214	0.486		0.131	0.140		0.0564	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Cesium-137	-0.0317	U	0.0529	0.0530	0.0700	0.0414	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Lead-210	-0.414	U	0.909	0.911		0.736	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Lead-212	0.406		0.0717	0.0833		0.0354	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Lead-214	0.445		0.0998	0.109		0.0477	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Potassium-40	6.87		1.02	1.24		0.302	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Protactinium-231	0.412	U	1.55	1.55		1.75	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Protactinium-234	0.138	U	0.236	0.236		0.178	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Radium-226	0.486		0.131	0.140	0.200	0.0564	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Radium-228	0.428		0.157	0.163		0.123	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Thallium-208	0.190		0.0545	0.0578		0.0196	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Thorium-232	0.428		0.157	0.163		0.123	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Thorium-234	0.543		0.284	0.290		0.257	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Thorium 228	0.406		0.0717	0.0833		0.0354	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Uranium-235	0.0766	U	0.184	0.184		0.314	pCi/g	10/16/20 13:49	11/09/20 19:47	1
Uranium-238	0.543		0.284	0.290		0.257	pCi/g	10/16/20 13:49	11/09/20 19:47	1

Client Sample ID: HPPG-ESU-TU098A-018

Lab Sample ID: 160-39695-18

Matrix: Solid

Date Collected: 09/28/20 15:28
Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.169	U	0.595	0.595		0.364	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Actinium 228	0.406		0.180	0.184		0.114	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Bismuth-212	0.247	U	0.669	0.669		0.524	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Bismuth-214	0.314		0.127	0.131		0.0571	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Cesium-137	0.0286	U	0.0545	0.0546	0.0700	0.0417	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Lead-210	0.419	U	1.23	1.23		0.880	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Lead-212	0.390		0.0810	0.0954		0.0298	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Lead-214	0.471		0.111	0.121		0.0546	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Potassium-40	7.43		1.29	1.50		0.308	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Protactinium-231	0.000	U	0.334	0.334		2.25	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Protactinium-234	0.120	U	0.221	0.221		0.228	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Radium-226	0.314		0.127	0.131	0.200	0.0571	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Radium-228	0.406		0.180	0.184		0.114	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Thallium-208	0.121		0.0500	0.0516		0.0203	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Thorium-232	0.406		0.180	0.184		0.114	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Thorium-234	-0.417	U	1.01	1.01		0.845	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Thorium 228	0.390		0.0810	0.0954		0.0298	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Uranium-235	0.0880	U	0.204	0.204		0.447	pCi/g	10/16/20 13:49	11/09/20 19:44	1
Uranium-238	-0.417	U	1.01	1.01		0.845	pCi/g	10/16/20 13:49	11/09/20 19:44	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-019

Lab Sample ID: 160-39695-19

Date Collected: 09/28/20 15:47

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.0745	U	0.274	0.274		0.329	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Actinium 228	0.671		0.178	0.190		0.0269	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Bismuth-212	-0.298	U	0.757	0.758		0.599	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Bismuth-214	0.325		0.103	0.108		0.0465	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Cesium-137	0.0237	U	0.0456	0.0457	0.0700	0.0348	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Lead-210	-0.747	U		1.62		1.30	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Lead-212	0.459		0.0838	0.103		0.0338	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Lead-214	0.357		0.121	0.127		0.0585	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Potassium-40	9.28		1.30	1.61		0.106	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Protactinium-231	0.592	U	1.73	1.73		1.90	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Protactinium-234	0.0903	U	0.254	0.254		0.206	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Radium-226	0.325		0.103	0.108	0.200	0.0465	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Radium-228	0.671		0.178	0.190		0.0269	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Thallium-208	0.190		0.0569	0.0602		0.0174	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Thorium-232	0.671		0.178	0.190		0.0269	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Thorium-234	0.000	U	0.421	0.421		0.702	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Thorium 228	0.459		0.0838	0.103		0.0338	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Uranium-235	0.000	U	0.173	0.173		0.379	pCi/g	10/16/20 13:49	11/09/20 19:45	1
Uranium-238	0.000	U	0.421	0.421		0.702	pCi/g	10/16/20 13:49	11/09/20 19:45	1

Client Sample ID: HPPG-ESU-TU098A-020

Lab Sample ID: 160-39695-20

Date Collected: 09/28/20 15:49

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.422	U	0.803	0.804		0.483	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Actinium 228	0.635		0.203	0.213		0.0703	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Bismuth-212	0.344	U	0.849	0.850		0.665	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Bismuth-214	0.479		0.144	0.152		0.0608	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Cesium-137	-0.00208	U	0.0620	0.0620	0.0700	0.0509	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Lead-210	0.220	U	1.45	1.45		1.09	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Lead-212	0.542		0.106	0.121		0.0455	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Lead-214	0.504		0.165	0.173		0.0764	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Potassium-40	6.34		2.00	2.10		0.763	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Protactinium-231	0.728	U	2.29	2.29		2.51	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Protactinium-234	0.145	U	0.302	0.303		0.275	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Radium-226	0.479		0.144	0.152	0.200	0.0608	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Radium-228	0.635		0.203	0.213		0.0703	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Thallium-208	0.249		0.0782	0.0822		0.0257	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Thorium-232	0.635		0.203	0.213		0.0703	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Thorium-234	-0.300	U	1.34	1.34		1.11	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Thorium 228	0.542		0.106	0.121		0.0455	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Uranium-235	0.000	U	0.264	0.264		0.486	pCi/g	10/16/20 13:49	11/09/20 19:46	1
Uranium-238	-0.300	U	1.34	1.34		1.11	pCi/g	10/16/20 13:49	11/09/20 19:46	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-021

Lab Sample ID: 160-39695-21

Date Collected: 09/28/20 15:51

Matrix: Solid

Date Received: 10/01/20 09:30

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	-0.109	U	0.0692	0.0696	0.160	0.0656	pCi/g	10/14/20 12:28	10/31/20 10:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	77.4		40 - 110					10/14/20 12:28	10/31/20 10:48	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.244	U	0.438	0.439		0.380	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Actinium 228	0.616		0.230	0.238		0.0781	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Bismuth-212	0.339	U	0.905	0.906		0.719	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Bismuth-214	0.603		0.181	0.192		0.0780	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Cesium-137	0.0354	U	0.0573	0.0574	0.0700	0.0434	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Lead-210	-1.22	U	1.47	1.48		1.23	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Lead-212	0.557		0.112	0.133		0.0578	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Lead-214	0.491		0.157	0.165		0.0763	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Potassium-40	8.20		1.81	2.00		0.702	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Protactinium-231	0.783	U	2.43	2.43		2.66	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Protactinium-234	0.0606	U	0.148	0.148		0.233	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Radium-226	0.603		0.181	0.192	0.200	0.0780	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Radium-228	0.616		0.230	0.238		0.0781	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Thallium-208	0.176		0.0721	0.0744		0.0347	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Thorium-232	0.616		0.230	0.238		0.0781	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Thorium-234	0.400	U	0.468	0.470		0.443	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Thorium 228	0.557		0.112	0.133		0.0578	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Uranium-235	0.152	U	0.309	0.310		0.329	pCi/g	10/16/20 13:49	11/09/20 19:49	1
Uranium-238	0.400	U	0.468	0.470		0.443	pCi/g	10/16/20 13:49	11/09/20 19:49	1

Client Sample ID: HPPG-ESU-TU098A-022

Lab Sample ID: 160-39695-22

Date Collected: 09/28/20 15:55

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	-0.190	U	0.692	0.692		0.406	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Actinium 228	0.115	U	0.252	0.252		0.171	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Bismuth-212	0.321	U	1.04	1.04		0.827	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Bismuth-214	0.601		0.177	0.187		0.0678	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Cesium-137	-0.0689	U	0.0523	0.0527	0.0700	0.0976	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Lead-210	1.67		1.29	1.31		0.787	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Lead-212	0.418		0.104	0.113		0.0588	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Lead-214	0.498		0.141	0.150		0.0831	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Potassium-40	8.60		1.61	1.83		0.349	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Protactinium-231	0.0624	U	3.24	3.24		2.67	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Protactinium-234	0.0907	U	0.289	0.289		0.235	pCi/g	10/16/20 13:49	11/09/20 19:51	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-022

Lab Sample ID: 160-39695-22

Date Collected: 09/28/20 15:55
Date Received: 10/01/20 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Radium-226	0.601		0.177	0.187	0.200	0.0678	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Radium-228	0.115	U	0.252	0.252		0.171	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Thallium-208	0.113		0.108	0.108		0.0523	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Thorium-232	0.115	U	0.252	0.252		0.171	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Thorium-234	0.743		0.574	0.580		0.415	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Thorium 228	0.418		0.104	0.113		0.0588	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Uranium-235	-0.278	U	0.482	0.483		0.479	pCi/g	10/16/20 13:49	11/09/20 19:51	1
Uranium-238	0.743		0.574	0.580		0.415	pCi/g	10/16/20 13:49	11/09/20 19:51	1

Client Sample ID: HPPG-ESU-TU098A-023

Lab Sample ID: 160-39695-23

Date Collected: 09/28/20 16:07
Date Received: 10/01/20 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.0160	U	0.561	0.561		0.333	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Actinium 228	0.687		0.183	0.195		0.0591	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Bismuth-212	0.263	U	0.645	0.645		0.508	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Bismuth-214	0.646		0.164	0.176		0.0696	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Cesium-137	0.00898	U	0.0585	0.0585	0.0700	0.0475	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Lead-210	-0.468	U	0.930	0.932		0.749	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Lead-212	0.442		0.0854	0.0971		0.0437	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Lead-214	0.591		0.132	0.145		0.0577	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Potassium-40	9.00		1.30	1.59		0.377	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Protactinium-231	0.000	U	0.730	0.730		2.18	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Protactinium-234	0.136	U	0.255	0.255		0.198	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Radium-226	0.646		0.164	0.176	0.200	0.0696	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Radium-228	0.687		0.183	0.195		0.0591	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Thallium-208	0.239		0.0690	0.0731		0.0244	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Thorium-232	0.687		0.183	0.195		0.0591	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Thorium-234	0.158	U	0.339	0.339		1.03	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Thorium 228	0.442		0.0854	0.0971		0.0437	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Uranium-235	-0.0864	U	0.477	0.477		0.391	pCi/g	10/16/20 13:49	11/09/20 20:51	1
Uranium-238	0.158	U	0.339	0.339		1.03	pCi/g	10/16/20 13:49	11/09/20 20:51	1

Client Sample ID: HPPG-ESU-TU098A-024

Lab Sample ID: 160-39695-24

Date Collected: 09/28/20 16:28
Date Received: 10/01/20 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
Actinium-227	0.112	U	0.434	0.434		0.414	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Actinium 228	0.777		0.202	0.217		0.112	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Bismuth-212	0.369	U	0.826	0.827		0.650	pCi/g	10/16/20 13:49	11/09/20 20:55	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Client Sample ID: HPPG-ESU-TU098A-024

Lab Sample ID: 160-39695-24

Date Collected: 09/28/20 16:28

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Bismuth-214	0.677		0.181	0.194		0.0694	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Cesium-137	0.0262	U	0.0671	0.0672	0.0700	0.0531	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Lead-210	0.740		1.04	1.04		0.688	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Lead-212	0.643		0.118	0.145		0.0619	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Lead-214	0.629		0.138	0.152		0.0797	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Potassium-40	9.57		1.50	1.79		0.438	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Protactinium-231	0.119	U	1.48	1.48		2.72	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Protactinium-234	0.0677	U	0.171	0.172		0.191	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Radium-226	0.677		0.181	0.194	0.200	0.0694	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Radium-228	0.777		0.202	0.217		0.112	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Thallium-208	0.225		0.0839	0.0871		0.0373	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Thorium-232	0.777		0.202	0.217		0.112	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Thorium-234	0.524		0.576	0.579		0.442	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Thorium-228	0.643		0.118	0.145		0.0619	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Uranium-235	0.144	U	0.422	0.422		0.342	pCi/g	10/16/20 13:49	11/09/20 20:55	1
Uranium-238	0.524		0.576	0.579		0.442	pCi/g	10/16/20 13:49	11/09/20 20:55	1

Client Sample ID: HPPG-ESU-TU098A-025

Lab Sample ID: 160-39695-25

Date Collected: 09/28/20 16:39

Matrix: Solid

Date Received: 10/01/20 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.0528	U	0.600	0.600		0.371	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Actinium-228	0.593		0.335	0.340		0.152	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Bismuth-212	0.473	U	0.812	0.814		0.622	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Bismuth-214	0.0916	U	0.149	0.149		0.146	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Cesium-137	0.0322	U	0.0733	0.0734	0.0700	0.0573	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Lead-210	1.14		1.06	1.07		0.667	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Lead-212	0.441		0.0914	0.102		0.0448	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Lead-214	0.548		0.115	0.128		0.0565	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Potassium-40	7.82		1.59	1.78		0.458	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Protactinium-231	0.570	U	2.32	2.33		2.48	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Protactinium-234	0.162	U	0.266	0.267		0.208	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Radium-226	0.0916	U	0.149	0.149	0.200	0.146	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Radium-228	0.593		0.335	0.340		0.152	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Thallium-208	0.193		0.0795	0.0819		0.0336	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Thorium-232	0.593		0.335	0.340		0.152	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Thorium-234	0.587		0.478	0.483		0.418	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Thorium-228	0.441		0.0914	0.102		0.0448	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Uranium-235	-0.261	U	0.322	0.323		0.463	pCi/g	10/16/20 13:49	11/09/20 20:57	1
Uranium-238	0.587		0.478	0.483		0.418	pCi/g	10/16/20 13:49	11/09/20 20:57	1

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Client Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-39695-1
 SDG: GJ46599788

Client Sample ID: HPPG-F-001

 Date Collected: 09/28/20 15:43
 Date Received: 10/01/20 09:30

Lab Sample ID: 160-39695-26

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	0.180	U	0.362	0.363		0.259	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Actinium 228	0.250		0.215	0.216		0.132	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Bismuth-212	0.283	U	0.749	0.750		0.580	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Bismuth-214	0.201		0.117	0.118		0.0604	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Cesium-137	-0.0532	U	0.0591	0.0594	0.0700	0.0705	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Lead-210	-0.218	U		1.04		0.764	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Lead-212	0.296		0.0887	0.0966		0.0392	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Lead-214	0.203		0.0949	0.0972		0.0851	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Potassium-40	6.83		1.81	1.94		0.624	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Protactinium-231	-0.0811	U	0.175	0.175		1.79	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Protactinium-234	-0.0858	U	0.205	0.205		0.178	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Radium-226	0.201		0.117	0.118	0.200	0.0604	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Radium-228	0.250		0.215	0.216		0.132	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Thallium-208	0.161		0.0529	0.0555		0.00993	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Thorium-232	0.250		0.215	0.216		0.132	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Thorium-234	-0.747	U		1.00		0.840	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Thorium 228	0.296		0.0887	0.0966		0.0392	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Uranium-235	-0.167	U	0.354	0.354		0.290	pCi/g	10/16/20 13:49	11/09/20 19:48	1
Uranium-238	-0.747	U	1.00	1.01		0.840	pCi/g	10/16/20 13:49	11/09/20 19:48	1

Client Sample ID: HPPG-F-002

 Date Collected: 09/28/20 16:28
 Date Received: 10/01/20 09:30

Lab Sample ID: 160-39695-27

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium-227	-0.196	U	0.635	0.636		0.372	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Actinium 228	0.436		0.146	0.152		0.0602	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Bismuth-212	0.000	U	0.461	0.461		0.691	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Bismuth-214	0.465		0.144	0.152		0.0659	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Cesium-137	-0.0453	U	0.0741	0.0743	0.0700	0.0582	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Lead-210	-0.184	U	0.912	0.913		0.744	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Lead-212	0.448		0.0889	0.100		0.0471	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Lead-214	0.451		0.122	0.130		0.0700	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Potassium-40	7.30		1.20	1.41		0.384	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Protactinium-231	-0.950	U	2.91	2.91		2.37	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Protactinium-234	0.00830	U	0.0150	0.0150		0.220	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Radium-226	0.465		0.144	0.152	0.200	0.0659	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Radium-228	0.436		0.146	0.152		0.0602	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Thallium-208	0.179		0.0653	0.0678		0.0267	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Thorium-232	0.436		0.146	0.152		0.0602	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Thorium-234	-0.124	U	0.388	0.389		0.815	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Thorium 228	0.448		0.0889	0.100		0.0471	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Uranium-235	0.0895	U	0.463	0.463		0.379	pCi/g	10/16/20 13:49	11/10/20 09:24	1
Uranium-238	-0.124	U	0.388	0.389		0.815	pCi/g	10/16/20 13:49	11/10/20 09:24	1

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QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-485679/23-A

Matrix: Solid

Analysis Batch: 488098

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 485679

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.03101	U	0.0629	0.0630	0.160	0.0545	pCi/g	10/14/20 12:28	11/03/20 08:15	1
<hr/>										
Carrier	MB	MB	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac		
	Result	Qualifier								
Sr Carrier	77.6				40 - 110	10/14/20 12:28	11/03/20 08:15	1		

Lab Sample ID: LCS 160-485679/1-A

Matrix: Solid

Analysis Batch: 487744

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 485679

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Total Beta Strontium			7.78	7.850		0.647	0.160	0.0599	pCi/g	101	75 - 125
<hr/>											
Carrier	LCS	LCS	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
	Result	Qualifier									
Sr Carrier	75.2				40 - 110						

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-485411/1-A

Matrix: Solid

Analysis Batch: 488532

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 485411

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Actinium-227	0.09612	U	0.244	0.244		0.280	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Actinium 228	0.02435	U	0.0571	0.0571		0.0490	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Bismuth-212	0.0000	U	0.133	0.133		0.430	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Bismuth-214	-0.09333	U	0.105	0.106		0.199	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Cesium-137	-0.005095	U	0.0418	0.0418	0.0700	0.0796	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Lead-210	0.4685	U	1.26	1.26		0.940	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Lead-212	-0.001982	U	0.0793	0.0793		0.0650	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Lead-214	-0.07146	U	0.156	0.156		0.0937	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Potassium-40	-0.1967	U	0.611	0.611		0.304	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Protactinium-231	0.1638	U	1.10	1.10		1.71	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Protactinium-234	0.1241		0.118	0.118		0.120	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Radium-226	-0.09333	U	0.105	0.106	0.200	0.199	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Radium-228	0.02435	U	0.0571	0.0571		0.0490	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thallium-208	0.05572		0.0498	0.0502		0.0267	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium-232	0.02435	U	0.0571	0.0571		0.0490	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium-234	0.4298		0.396	0.399		0.356	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium 228	-0.001982	U	0.0793	0.0793		0.0650	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Uranium-235	0.01598	U	0.0437	0.0437		0.311	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Uranium-238	0.4298		0.396	0.399		0.356	pCi/g	10/13/20 17:37	11/08/20 17:27	1

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QC Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-39695-1
 SDG: GJ46599788

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-485411/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488526

Prep Batch: 485411

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	LOQ	Total		%Rec.	Limits
		Result	Qual			DLC	Unit		
Americium-241	96.4	98.41		11.6		0.545	pCi/g	102	87 - 116
Cesium-137	26.8	30.21		3.18	0.0700	0.130	pCi/g	113	87 - 120
Cobalt-60	9.59	10.15		1.07		0.0674	pCi/g	106	87 - 115

Lab Sample ID: 160-39695-7 DU

Client Sample ID: HPPG-ESU-TU098A-007

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488532

Prep Batch: 485411

Analyte	Sample	Sample	DU		Uncert. (2σ+/-)	LOQ	Total		RER	Limit
	Result	Qual	Result	Qual			DLC	Unit		
Actinium-227	0.0942	U	-0.3193	U	0.479		0.375	pCi/g	0.47	1
Actinium 228	0.386		0.3225		0.138		0.0348	pCi/g	0.22	1
Bismuth-212	-0.474	U	0.3309	U	0.751		0.583	pCi/g	0.52	1
Bismuth-214	0.296		0.1614		0.0941		0.152	pCi/g	0.69	1
Cesium-137	-0.0113	U	-0.04412	U	0.0439	0.0700	0.0581	pCi/g	0.30	1
Lead-210	0.378	U	-0.8131	U	1.57		1.33	pCi/g	0.47	1
Lead-212	0.292		0.2910		0.0784		0.0338	pCi/g	0.01	1
Lead-214	0.238		0.2237		0.122		0.0813	pCi/g	0.07	1
Potassium-40	6.81		6.740		1.48		0.216	pCi/g	0.02	1
Protactinium-231	-0.746	U	0.07065	U	0.933		1.88	pCi/g	0.23	1
Protactinium-234	0.131	U	0.06628	U	0.101		0.195	pCi/g	0.28	1
Radium-226	0.296		0.1614		0.0941	0.200	0.152	pCi/g	0.69	1
Radium-228	0.386		0.3225		0.138		0.0348	pCi/g	0.22	1
Thallium-208	0.0871		0.05532		0.110		0.0455	pCi/g	0.22	1
Thorium-232	0.386		0.3225		0.138		0.0348	pCi/g	0.22	1
Thorium-234	-0.412	U	-0.8535	U	0.647		0.714	pCi/g	0.32	1
Thorium 228	0.292		0.2910		0.0784		0.0338	pCi/g	0.01	1
Uranium-235	0.172		0.08900	U	0.102		0.344	pCi/g	0.26	1
Uranium-238	-0.412	U	-0.8535	U	0.647		0.714	pCi/g	0.32	1

Lab Sample ID: MB 160-485964/1-A

Client Sample ID: Method Blank

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488682

Prep Batch: 485964

Analyte	MB	MB	Count	Total		Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)	LOQ	DLC	Unit	
Actinium-227	0.1138	U	0.277	0.278		0.250	pCi/g	10/16/20 13:49
Actinium 228	0.02644	U	0.0522	0.0523		0.124	pCi/g	10/16/20 13:49
Bismuth-212	0.1877	U	0.433	0.433		0.332	pCi/g	10/16/20 13:49
Bismuth-214	0.05163	U	0.0927	0.0929		0.0588	pCi/g	10/16/20 13:49
Cesium-137	-0.03348	U	0.0567	0.0568	0.0700	0.0439	pCi/g	10/16/20 13:49
Lead-210	-0.4127	U	0.910	0.911		0.733	pCi/g	10/16/20 13:49
Lead-212	-0.04602	U	0.0780	0.0782		0.0846	pCi/g	10/16/20 13:49
Lead-214	-0.02349	U	0.0840	0.0840		0.0689	pCi/g	10/16/20 13:49
Potassium-40	-0.7712	U	0.580	0.585		0.556	pCi/g	10/16/20 13:49
Protactinium-231	0.5464	U	1.34	1.34		1.47	pCi/g	10/16/20 13:49
Protactinium-234	0.06470	U	0.181	0.182		0.139	pCi/g	10/16/20 13:49
Radium-226	0.05163	U	0.0927	0.0929	0.200	0.0588	pCi/g	10/16/20 13:49

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QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-485964/1-A

Client Sample ID: Method Blank

Matrix: Solid

Analysis Batch: 488682

Prep Type: Total/NA

Prep Batch: 485964

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)					
Radium-228	0.02644	U		0.0522		0.0523		0.124	pCi/g	10/16/20 13:49	11/10/20 17:25	1
Thallium-208	0.01920	U		0.0420		0.0420		0.0332	pCi/g	10/16/20 13:49	11/10/20 17:25	1
Thorium-232	0.02644	U		0.0522		0.0523		0.124	pCi/g	10/16/20 13:49	11/10/20 17:25	1
Thorium-234	0.09639	U		0.232		0.232		0.558	pCi/g	10/16/20 13:49	11/10/20 17:25	1
Thorium 228	-0.04602	U		0.0780		0.0782		0.0846	pCi/g	10/16/20 13:49	11/10/20 17:25	1
Uranium-235	0.0000	U		0.0810		0.0810		0.245	pCi/g	10/16/20 13:49	11/10/20 17:25	1
Uranium-238	0.09639	U		0.232		0.232		0.558	pCi/g	10/16/20 13:49	11/10/20 17:25	1

Lab Sample ID: LCS 160-485964/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Analysis Batch: 488618

Prep Type: Total/NA

Prep Batch: 485964

Analyte	Spike Added	LCS Result	LCS Qual	Total		DLC	Unit	%Rec	Limits	RER	Limit
				Uncert.	(2σ+/-)						
Americium-241	99.9	112.8		11.8		0.360	pCi/g	113	87 - 116		
Cesium-137	30.6	30.38		3.21		0.0700	pCi/g	99	87 - 120		
Cobalt-60	17.3	16.52		1.70		0.0608	pCi/g	95	87 - 115		

Lab Sample ID: 160-39695-27 DU

Client Sample ID: HPPG-F-002

Matrix: Solid

Analysis Batch: 488678

Prep Type: Total/NA

Prep Batch: 485964

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total		DLC	Unit	RER	Limit
					Uncert.	(2σ+/-)				
Actinium-227	-0.196	U	0.1080	U	0.416		0.359	pCi/g	0.29	1
Actinium 228	0.436		0.1543	U	0.292		0.201	pCi/g	0.63	1
Bismuth-212	0.000	U	-0.01368	U	0.954		0.785	pCi/g	0.01	1
Bismuth-214	0.465		0.4539		0.190		0.0846	pCi/g	0.03	1
Cesium-137	-0.0453	U	-0.00584	U	0.0689		0.0563	pCi/g	0.28	1
Lead-210	-0.184	U	0.1016	U	1.06		0.727	pCi/g	0.14	1
Lead-212	0.448		0.4729		0.111		0.0519	pCi/g	0.12	1
Lead-214	0.451		0.4364		0.140		0.0693	pCi/g	0.06	1
Potassium-40	7.30		8.042		1.59		0.421	pCi/g	0.25	1
Protactinium-231	-0.950	U	-1.073	U	3.15		2.56	pCi/g	0.02	1
Protactinium-234	0.00830	U	0.1048	U	0.144		0.291	pCi/g	0.61	1
Radium-226	0.465		0.4539		0.190		0.0846	pCi/g	0.03	1
Radium-228	0.436		0.1543	U	0.292		0.201	pCi/g	0.63	1
Thallium-208	0.179		0.2353		0.0790		0.0302	pCi/g	0.38	1
Thorium-232	0.436		0.1543	U	0.292		0.201	pCi/g	0.63	1
Thorium-234	-0.124	U	1.285		0.691		0.540	pCi/g	1.30	1
Thorium 228	0.448		0.4729		0.111		0.0519	pCi/g	0.12	1
Uranium-235	0.0895	U	0.1835	U	0.450		0.538	pCi/g	0.10	1
Uranium-238	-0.124	U	1.285		0.691		0.540	pCi/g	1.30	1

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Rad

Leach Batch: 484731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39695-5	HPPG-ESU-TU098A-005	Total/NA	Solid	Dry and Grind	
160-39695-6	HPPG-ESU-TU098A-006	Total/NA	Solid	Dry and Grind	

Leach Batch: 484742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39695-1	HPPG-ESU-TU098A-001	Total/NA	Solid	Dry and Grind	
160-39695-2	HPPG-ESU-TU098A-002	Total/NA	Solid	Dry and Grind	
160-39695-3	HPPG-ESU-TU098A-003	Total/NA	Solid	Dry and Grind	
160-39695-4	HPPG-ESU-TU098A-004	Total/NA	Solid	Dry and Grind	
160-39695-7	HPPG-ESU-TU098A-007	Total/NA	Solid	Dry and Grind	
160-39695-8	HPPG-ESU-TU098A-008	Total/NA	Solid	Dry and Grind	
160-39695-9	HPPG-ESU-TU098A-009	Total/NA	Solid	Dry and Grind	
160-39695-10	HPPG-ESU-TU098A-010	Total/NA	Solid	Dry and Grind	
160-39695-11	HPPG-ESU-TU098A-011	Total/NA	Solid	Dry and Grind	
160-39695-12	HPPG-ESU-TU098A-012	Total/NA	Solid	Dry and Grind	
160-39695-13	HPPG-ESU-TU098A-013	Total/NA	Solid	Dry and Grind	
160-39695-7 DU	HPPG-ESU-TU098A-007	Total/NA	Solid	Dry and Grind	

Leach Batch: 485029

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39695-14	HPPG-ESU-TU098A-014	Total/NA	Solid	Dry and Grind	
160-39695-15	HPPG-ESU-TU098A-015	Total/NA	Solid	Dry and Grind	
160-39695-16	HPPG-ESU-TU098A-016	Total/NA	Solid	Dry and Grind	
160-39695-17	HPPG-ESU-TU098A-017	Total/NA	Solid	Dry and Grind	
160-39695-18	HPPG-ESU-TU098A-018	Total/NA	Solid	Dry and Grind	
160-39695-19	HPPG-ESU-TU098A-019	Total/NA	Solid	Dry and Grind	
160-39695-20	HPPG-ESU-TU098A-020	Total/NA	Solid	Dry and Grind	
160-39695-21	HPPG-ESU-TU098A-021	Total/NA	Solid	Dry and Grind	
160-39695-22	HPPG-ESU-TU098A-022	Total/NA	Solid	Dry and Grind	
160-39695-23	HPPG-ESU-TU098A-023	Total/NA	Solid	Dry and Grind	
160-39695-24	HPPG-ESU-TU098A-024	Total/NA	Solid	Dry and Grind	
160-39695-25	HPPG-ESU-TU098A-025	Total/NA	Solid	Dry and Grind	
160-39695-26	HPPG-F-001	Total/NA	Solid	Dry and Grind	
160-39695-27	HPPG-F-002	Total/NA	Solid	Dry and Grind	
160-39695-27 DU	HPPG-F-002	Total/NA	Solid	Dry and Grind	

Prep Batch: 485411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39695-1	HPPG-ESU-TU098A-001	Total/NA	Solid	Fill_Geo-21	484742
160-39695-2	HPPG-ESU-TU098A-002	Total/NA	Solid	Fill_Geo-21	484742
160-39695-3	HPPG-ESU-TU098A-003	Total/NA	Solid	Fill_Geo-21	484742
160-39695-4	HPPG-ESU-TU098A-004	Total/NA	Solid	Fill_Geo-21	484742
160-39695-5	HPPG-ESU-TU098A-005	Total/NA	Solid	Fill_Geo-21	484731
160-39695-6	HPPG-ESU-TU098A-006	Total/NA	Solid	Fill_Geo-21	484731
160-39695-7	HPPG-ESU-TU098A-007	Total/NA	Solid	Fill_Geo-21	484742
MB 160-485411/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-485411/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-39695-7 DU	HPPG-ESU-TU098A-007	Total/NA	Solid	Fill_Geo-21	484742

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Rad

Prep Batch: 485679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39695-1	HPPG-ESU-TU098A-001	Total/NA	Solid	DPS-0	484742
160-39695-11	HPPG-ESU-TU098A-011	Total/NA	Solid	DPS-0	484742
160-39695-21	HPPG-ESU-TU098A-021	Total/NA	Solid	DPS-0	485029
MB 160-485679/23-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-485679/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

Prep Batch: 485964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39695-8	HPPG-ESU-TU098A-008	Total/NA	Solid	Fill_Geo-21	484742
160-39695-9	HPPG-ESU-TU098A-009	Total/NA	Solid	Fill_Geo-21	484742
160-39695-10	HPPG-ESU-TU098A-010	Total/NA	Solid	Fill_Geo-21	484742
160-39695-11	HPPG-ESU-TU098A-011	Total/NA	Solid	Fill_Geo-21	484742
160-39695-12	HPPG-ESU-TU098A-012	Total/NA	Solid	Fill_Geo-21	484742
160-39695-13	HPPG-ESU-TU098A-013	Total/NA	Solid	Fill_Geo-21	484742
160-39695-14	HPPG-ESU-TU098A-014	Total/NA	Solid	Fill_Geo-21	485029
160-39695-15	HPPG-ESU-TU098A-015	Total/NA	Solid	Fill_Geo-21	485029
160-39695-16	HPPG-ESU-TU098A-016	Total/NA	Solid	Fill_Geo-21	485029
160-39695-17	HPPG-ESU-TU098A-017	Total/NA	Solid	Fill_Geo-21	485029
160-39695-18	HPPG-ESU-TU098A-018	Total/NA	Solid	Fill_Geo-21	485029
160-39695-19	HPPG-ESU-TU098A-019	Total/NA	Solid	Fill_Geo-21	485029
160-39695-20	HPPG-ESU-TU098A-020	Total/NA	Solid	Fill_Geo-21	485029
160-39695-21	HPPG-ESU-TU098A-021	Total/NA	Solid	Fill_Geo-21	485029
160-39695-22	HPPG-ESU-TU098A-022	Total/NA	Solid	Fill_Geo-21	485029
160-39695-23	HPPG-ESU-TU098A-023	Total/NA	Solid	Fill_Geo-21	485029
160-39695-24	HPPG-ESU-TU098A-024	Total/NA	Solid	Fill_Geo-21	485029
160-39695-25	HPPG-ESU-TU098A-025	Total/NA	Solid	Fill_Geo-21	485029
160-39695-26	HPPG-F-001	Total/NA	Solid	Fill_Geo-21	485029
160-39695-27	HPPG-F-002	Total/NA	Solid	Fill_Geo-21	485029
MB 160-485964/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-485964/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-39695-27 DU	HPPG-F-002	Total/NA	Solid	Fill_Geo-21	485029

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39695-1
SDG: GJ46599788

Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-39695-1	HPPG-ESU-TU098A-001	77.6	
160-39695-11	HPPG-ESU-TU098A-011	78.4	
160-39695-21	HPPG-ESU-TU098A-021	77.4	
LCS 160-485679/1-A	Lab Control Sample	75.2	
MB 160-485679/23-A	Method Blank	77.6	

Tracer/Carrier Legend

Sr = Sr Carrier

Eurofins TestAmerica, St. Louis



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-39694-1
Laboratory Sample Delivery Group: D1189477
Client Project/Site: HPNS-Parcel G 501197
Revision: 2

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
4/5/2021 4:44:56 PM
Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Job ID: 160-39694-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-39694-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

Revision 1- added Pa234 to gamma list

Revision 2- Additional information requested in case narrative for total Strontium, updated SDG to reflect evidence bag ID.

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Job ID: 160-39694-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

RECEIPT

The samples were received on 10/01/2020; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 17.0 C.

TOTAL BETA STRONTIUM (GFPC)

Sample HPPG-ESU-TU098A-B-001 (160-39694-1) was analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 10/06/2020, prepared on 10/14/2020 and analyzed on 10/31/2020.

When taking small mass aliquots from dried/disaggregated sample, the laboratory avoids large rocks/pebbles (as well as sticks, etc) which may constitute a larger than representative portion of the aliquot. Smaller rocks may be included. This is consistent with QSM and Laboratory SOP. HPPG-ESU-TU098A-B-001 (160-39694-1).

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Sample HPPG-ESU-TU098A-B-001 (160-39694-1) was analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 10/06/2020, prepared on 10/13/2020 and analyzed on 11/08/2020.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The method blank (MB) Z-score is within limits and is located in the level IV raw data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



CHAIN OF CUSTODY

Ref. Document # 501197RSY-002

Page 1 of 2

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager: Lisa Bercik
Phone #: (619)213-3389Send Report to: Rose Condit
Phone/Fax Number: 415-987-0760
Address: 4005 Port Chicago Hwy

Sample Lead: Lewis, Devin

Sample Tech(s): Joaquin Ramirez

Lab Contact Name/ph #				Analysis Requested											
				Total Strontium (EPA 905 Method)		Dose Rate uR/Hr		Evidence Bag ID		Comment					
Matrix	# of Containers	Preservatives (water)													
		Preservatives (soil)													
		Container Type													
HPPG-ESU-TU098A-B-001	9/29/2020	11:16	G	SO	1	16 oz. plastic jar	X	X					4	D1189477	

Special Instructions:

21 day ingrowth results only

Analyze for Total Strontium as a screening step, and Isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g

Turnaround Time: 3-day 10-Day 28-day Other Level of QC Required: I II III Project Specific

Method Codes C = Composite G = Grab Matrix Codes: DW = Drinking Water; So = Soil; GW = Ground Water; SL = Sludge; WW = Waste Water; CP = Chip Samples; A = Air; ABS = Asbestos; PO = Pipe Opening

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		09/29/2020 15:51	Locked Storage (RKilpack)		09/29/2020 15:51
Locked Storage (RKilpack)		09/30/2020 13:45	Joaquin Ramirez		09/30/2020 13:45
Joaquin Ramirez		09/30/2020 13:53	SHIPPEDTOLAB		10/1/2020 09:30

*** Last 3 transfers shown above - Complete list of transfers on last page ***

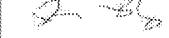
10/9/2020



ED_006360A_00000168-00088

All Transfers for COC 501197RSY-002

Page 2 of 2

Relinquished By:	Relinquisher Signature:	Relinquish Date Time:	Received By:	Received Signature:	Receive Date Time:
Lewis, Devin		09/29/2020 15:51	Locked Storage (RKillpack)		09/29/2020 15:51
Locked Storage (RKillpack)		09/30/2020 13:45	Joaquin Ramirez		09/30/2020 13:45
Joaquin Ramirez		09/30/2020 13:53	SHIPPEDTOLAB		09/30/2020 13:53

ee 9/30/20
2020



ED_006360A_00000168-00089

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-39694-1
SDG Number: D1189477**Login Number:** 39694**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Mazariegos, Leonel A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy

None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, St. Louis

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
160-39694-1	HPPG-ESU-TU098A-B-001	Solid	09/29/20 11:16	10/01/20 09:30	

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Client Sample ID: HPPG-ESU-TU098A-B-001

Lab Sample ID: 160-39694-1

Matrix: Solid

Date Collected: 09/29/20 11:16
Date Received: 10/01/20 09:30

Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0734		0.0787	0.0788	0.160	0.0588	pCi/g	10/14/20 12:28	10/31/20 10:47	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	74.8		40 - 110					10/14/20 12:28	10/31/20 10:47	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium-227	0.137	U	0.384	0.385		0.304	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Actinium 228	0.277		0.209	0.211		0.109	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Bismuth-212	-0.623	U	1.06	1.06		0.826	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Bismuth-214	0.455		0.144	0.152		0.0595	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Cesium-137	0.00820	U	0.0537	0.0537	0.0700	0.0429	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Lead-210	0.839		0.785	0.791		0.513	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Lead-212	0.495		0.0924	0.112		0.0370	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Lead-214	0.403		0.114	0.122		0.0593	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Potassium-40	7.89		1.41	1.63		0.236	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Protactinium-231	-0.0000004	U	2.41	2.41		1.99	pCi/g	10/13/20 17:37	11/08/20 19:27	1
	59									
Protactinium-234	0.0391	U	0.143	0.143		0.162	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Radium-226	0.455		0.144	0.152	0.200	0.0595	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Radium-228	0.277		0.209	0.211		0.109	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thallium-208	0.210		0.0556	0.0597		0.00825	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thorium-232	0.277		0.209	0.211		0.109	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thorium-234	1.02		0.511	0.524		0.306	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Thorium 228	0.495		0.0924	0.112		0.0370	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Uranium-235	0.0639	U	0.305	0.305		0.248	pCi/g	10/13/20 17:37	11/08/20 19:27	1
Uranium-238	1.02		0.511	0.524		0.306	pCi/g	10/13/20 17:37	11/08/20 19:27	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-485679/23-A

Matrix: Solid

Analysis Batch: 488098

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 485679

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.03101	U	0.0629	0.0630	0.160	0.0545	pCi/g	10/14/20 12:28	11/03/20 08:15	1
<hr/>										
Carrier	MB	MB	%Yield	Qualifier	Limits			Prepared	Analyzed	Dil Fac
Sr Carrier	77.6				40 - 110			10/14/20 12:28	11/03/20 08:15	1

Lab Sample ID: LCS 160-485679/1-A

Matrix: Solid

Analysis Batch: 487744

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 485679

Analyte	MB	MB	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Result	Qualifier									
Total Beta Strontium			7.78	7.850		0.647	0.160	0.0599	pCi/g	101	75 - 125
<hr/>											
Carrier	LCS	LCS	%Yield	Qualifier	Limits						
Sr Carrier	75.2				40 - 110						

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-485411/1-A

Matrix: Solid

Analysis Batch: 488532

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 485411

Analyte	MB	MB	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Actinium-227	0.09612	U	0.244	0.244		0.280	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Actinium 228	0.02435	U	0.0571	0.0571		0.0490	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Bismuth-212	0.0000	U	0.133	0.133		0.430	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Bismuth-214	-0.09333	U	0.105	0.106		0.199	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Cesium-137	-0.005095	U	0.0418	0.0418	0.0700	0.0796	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Lead-210	0.4685	U	1.26	1.26		0.940	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Lead-212	-0.001982	U	0.0793	0.0793		0.0650	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Lead-214	-0.07146	U	0.156	0.156		0.0937	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Potassium-40	-0.1967	U	0.611	0.611		0.304	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Protactinium-231	0.1638	U	1.10	1.10		1.71	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Protactinium-234	0.1241		0.118	0.118		0.120	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Radium-226	-0.09333	U	0.105	0.106	0.200	0.199	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Radium-228	0.02435	U	0.0571	0.0571		0.0490	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium-208	0.05572		0.0498	0.0502		0.0267	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium-232	0.02435	U	0.0571	0.0571		0.0490	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium-234	0.4298		0.396	0.399		0.356	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Thorium 228	-0.001982	U	0.0793	0.0793		0.0650	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Uranium-235	0.01598	U	0.0437	0.0437		0.311	pCi/g	10/13/20 17:37	11/08/20 17:27	1
Uranium-238	0.4298		0.396	0.399		0.356	pCi/g	10/13/20 17:37	11/08/20 17:27	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-485411/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 488526

Prep Batch: 485411

Analyte	Spike Added	LCS		Total		DLC	Unit	%Rec	%Rec. Limits
		Result	Qual	Uncert. (2σ+/-)	LOQ				
Americium-241	96.4	98.41		11.6		0.545	pCi/g	102	87 - 116
Cesium-137	26.8	30.21		3.18	0.0700	0.130	pCi/g	113	87 - 120
Cobalt-60	9.59	10.15		1.07		0.0674	pCi/g	106	87 - 115

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Rad

Leach Batch: 484742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39694-1	HPPG-ESU-TU098A-B-001	Total/NA	Solid	Dry and Grind	

Prep Batch: 485411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39694-1	HPPG-ESU-TU098A-B-001	Total/NA	Solid	Fill_Geo-21	484742
MB 160-485411/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-485411/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 485679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-39694-1	HPPG-ESU-TU098A-B-001	Total/NA	Solid	DPS-0	484742
MB 160-485679/23-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-485679/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

Eurofins TestAmerica, St. Louis

Tracer/Carrier Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-39694-1
SDG: D1189477

Method: 905.0 - Total Beta Strontium (GFPC)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits)	
		Sr	(40-110)
160-39694-1	HPPG-ESU-TU098A-B-001	74.8	
LCS 160-485679/1-A	Lab Control Sample	75.2	
MB 160-485679/23-A	Method Blank	77.6	

Tracer/Carrier Legend

Sr = Sr Carrier

Eurofins TestAmerica, St. Louis



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

Laboratory Job ID: 160-42478-1
Laboratory Sample Delivery Group: GJ46599757
Client Project/Site: HPNS-Parcel G 501197

For:
Aptim Federal Services LLC
4005 Port Chicago Hwy, Suite 200
Concord, California 94520

Attn: Rose Condit

Rhonda Ridenhower

Authorized for release by:
7/21/2021 11:43:41 PM

Rhonda Ridenhower, Client Service Manager
(314)298-8566
Rhonda.Ridenhower@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Job ID: 160-42478-1

Laboratory: Eurofins TestAmerica, St. Louis

Narrative

CASE NARRATIVE

Client: Aptim Federal Services LLC

Project: HPNS-Parcel G 501197

Report Number: 160-42478-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, St. Louis attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an ""as received"" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The matrix for the Method Blank and LCS is as close to the following samples as can be reasonably achieved. Detailed information can be found in the most current revision of the associated SOP.

Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 06/21/2021; the samples arrived in good condition, properly preserved. The temperature of the coolers at

Case Narrative

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Job ID: 160-42478-1 (Continued)

Laboratory: Eurofins TestAmerica, St. Louis (Continued)

receipt was 26.4 C.

The original COC marked with total strontium, confirmed with client that it should be strontium 90. Strontium 90 was subsequently canceled- revised COC included in report.

RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples HPPG-ESU-TU098A-008A (160-42478-1), HPPG-ESU-TU098A-012A (160-42478-2), HPPG-ESU-TU098A-013A (160-42478-3), HPPG-ESU-TU098A-014A (160-42478-4), HPPG-ESU-TU098A-015A (160-42478-5), HPPG-ESU-TU098A-016A (160-42478-6), HPPG-ESU-TU098A-017A (160-42478-7), HPPG-ESU-TU098A-021A (160-42478-8), HPPG-ESU-TU098A-022A (160-42478-9), HPPG-ESU-TU098A-023A (160-42478-10), HPPG-ESU-TU098A-024A (160-42478-11), HPPG-ESU-TU098A-025A (160-42478-12) and HPPG-F-002A (160-42478-13) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA_01_R. The samples were dried on 06/22/2021, prepared on 06/24/2021 and analyzed on 07/16/2021 and 07/17/2021.

Many isotopes requested for analysis do not have any gamma emissions, or the gamma emissions they do have are very poor. Often, such analytes are reported by gamma spectrometry assuming secular equilibrium with a longer-lived parent. The client should ensure that such inference is acceptable for their sample based upon process knowledge. The following assumptions were made for this report:

Inferred from	Reported to Analyte
Th-234	Pa-234
Th-234	U-238
Pb-210	Po-210
Pb-210	Bi-210
Cs-137	Ba-137m
Pb-212	Po-216
Xe-131m	Xe-131
Sb-125	Te-125m
Ag-108m	Ag-108
Rh-106	Ru-106
Pb-212	Th-228
Pb-212	Ra-224
U-235	Th-231
Ac-228	Th-232
Ac-228	Ra-228
Th-227	Ra-223
Th-227	Ac-227
Th-227	Bi-211
Th-227	Pb-211
Bi-214	Ra-226

The method blank (MB) z-score is within limits and is stored in the level IV raw data.

The detection goal of 0.0700 pCi/g was not met for Cs-137 for the following sample. An elevated MDC can occur when higher background counts are applied to a peak ROI. This is due to the relatively small size of the peak or subsequent "force-fit" of the non-existent peak which resulted in higher than normal background counts due to statistical fluctuations in the Compton baseline. The laboratory does not believe this adversely affects the data, as the Cs-137 result is well below the RL and MDC. HPPG-ESU-TU098A-024A (160-42478-11)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CHAIN OF CUSTODY

APTIM Federal Services, LLC

4005 Port Chicago Hwy
Concord, CA 94520Project Manager Lisa Bercik 619 446 4508
(Name & phone #)

Send Report To:	Roxe Condu
Phone/Fax Number:	415-987-0760
Address:	4005 Port Chicago Hwy
City:	Concord, CA, 94520

Sampler's Name(s): Trevor Rizzo		Collection Information				
Sample ID Number	Sample Description	Date	Time	Method	Matrix	# of Containers
HPPG-ESU-TU098A-008	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1427	G	SO	2
HPPG-ESU-TU098A-012	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1415	G	SO	2
HPPG-ESU-TU098A-013	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1430	G	SO	2
HPPG-ESU-TU098A-014	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1426	G	SO	2
HPPG-ESU-TU098A-015	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1438	G	SO	2
HPPG-ESU-TU098A-016	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1440	G	SO	2
HPPG-ESU-TU098A-017	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1435	G	SO	2
HPPG-ESU-TU098A-021	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1424	G	SO	2
HPPG-ESU-TU098A-022	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1447	G	SO	2
HPPG-ESU-TU098A-023	HPNS Parcel G ESU-TU098A Systematic Resample	6/16/21	1446	G	SO	2

Special Instructions: 21 day ingrowth results only

<input type="checkbox"/> 24-hr	Level of QC Required:					
Standard TAT -10-day	<input type="checkbox"/> 3-day	<input type="checkbox"/> 10-day	I	II	III	Project Specific
Relinquished By <u>Trevor Rizzo</u>	Date: 6/16/21	Received By: <u>Locked Storage</u>	Date: 6/16/21	Method Codes DW = Drinking Water	C = Composite	G = Grab
Relinquished By <u>Locked Storage</u>	Date: 6/17/21	Received By: <u>Trevor Rizzo</u>	Date: 6/17/21	Matrix Codes GW = Ground Water	SL = Sludge	WW = Waste Water
Relinquished By <u>FE</u>	Date:	Received By: <u>WJ</u>	Date: 6/17/21	CP = Chip Samples	A = Air	ABS=Asbestos, PO=Pipe Opening
Relinquished By	Date:	Received By	Date:	Time: 0930	Time:	see next page



ED_006360A_00000168-00103

CHAIN OF CUSTODY

Revised

R. Condit 6/21/21

Project Manager Lisa Bercik 619 446 4508
(Name & phone #)

Send Report To: <u>Rose Condit</u>
Phone/Fax Number: <u>415-987-0760</u>
Address: <u>4005 Port Chicago Hwy</u>
City: <u>Concord, CA 94520</u>

Sampler's Name(s): Trevor Rizzo

Sample ID Number	Sample Description	Collection Information			# of Containers	Preservative (water)	Preservative (soil)	Container Type	A/N	Cancel Sr analysis	Dose Rate µR/Hr
		Date	Time	Method							
HPPG-ESU-TU098A-008 A	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1427</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-012	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1415</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-013	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1430</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-014	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1426</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-015	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1438</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-016	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1440</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-017	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1435</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-021	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1424</u>	G	SO	2	16 oz. plastic jar	X	X		4
HPPG-ESU-TU098A-022	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1447</u>	G	SO	2	16 oz. plastic jar	X			4
HPPG-ESU-TU098A-023	HPNS Parcel G ESU-TU098A Systematic Resample	<u>6/16/21</u>	<u>1446</u>	G	SO	2	16 oz. plastic jar	X			4

Special Instructions: 21 day ingrowth results only

EVIDENCE BAG # GJ46599757

<input type="checkbox"/> 24-hr		Level Of QC Required			Project Specific			
<input type="checkbox"/> Standard TAT -10-day		<input type="checkbox"/> 3-day	<input type="checkbox"/> 10-day	I				II
Relinquished By <i>Trevor Rizzo</i>		Date: <u>6/16/21</u>	Received By: <i>Locked Storage</i>	Date: <u>6/16/21</u>			Method Codes C = Composite G = Grab	
Relinquished By <i>Locked Storage</i>		Date: <u>6/17/21</u>	Received By: <i>Trevor Rizzo</i>	Date: <u>6/17/21</u>			Matrix Codes DW = Drinking Water SO = Soil GW = Ground Water SL = Sludge WW = Waste Water CP = Chip Samples	
Relinquished By <i>FE</i>		Date:	Received By: <i>WJ</i>	Date: <u>6/17/21</u>			A = Air	
Relinquished By		Date:	Received By	Date:			ABS=Asbestos, PO=Pipe Opening	
		Time:		Time:				

see next page



ED_006360A_00000168-00105



CHAIN OF CUSTODY

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APTIM Federal Services, LLC

4005 Pot Chicago Hwy
Carmel, CA 93923

R.Condit 6/21/21

Project Manager: Lisa Bercik 619 446 4508
(Name & phone #)

Send Report To: Rose Condit
Phone/Fax Number: 415-987-0761

8-15-2005 Page 6

Address: 4003 Port Chicago Hwy

City: Concord, CA, 9452

Sampler's Name(s): Trevor Rizzo

Special Instructions: 21 day ingrowth results only

<input type="checkbox"/> 24-hr	Level Of QC Required:		
Standard TAT -10-day		<input type="checkbox"/> 3-day	<input type="checkbox"/> 10-day
		I	II
		III	Project Specific
Relinquished By: <i>Trevor Rizzo TR</i>		Date: <i>6/16/21</i> Time: <i>1736</i>	Received By: <i>Locked Storage</i>
			Date: <i>6/16/21</i> Time: <i>1736</i>
Relinquished By: <i>Locked Storage</i>		Date: <i>6/17/21</i> Time: <i>0655</i>	Received By: <i>Trev Rizzo TR</i>
			Date: <i>6/17/21</i> Time: <i>0455</i>
Relinquished By: <i>FE</i>		Date: Time:	Received By: <i>AM</i>
			Date: Time: <i>0930</i>
Method Codes C = Composite G = Grab Matrix Codes DW = Drinking Water SO = Soil GW = Ground Water SL = Sludge WW = Waste Water CP = Chip Samples A = Air ABS=Asbestos PO=Pipe Opening			

see next page

Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-42478-1
SDG Number: GJ46599757**Login Number:** 42478**List Source:** Eurofins TestAmerica, St. Louis**List Number:** 1**Creator:** Worthington, Sierra M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Definitions/Glossary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Qualifiers

Rad Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
%	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

Protocol References:

DOE = U.S. Department of Energy
None = None

Laboratory References:

TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Eurofins TestAmerica, St. Louis

Sample Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-42478-1	HPPG-ESU-TU098A-008A	Solid	06/16/21 14:27	06/21/21 09:30
160-42478-2	HPPG-ESU-TU098A-012A	Solid	06/16/21 14:15	06/21/21 09:30
160-42478-3	HPPG-ESU-TU098A-013A	Solid	06/16/21 14:30	06/21/21 09:30
160-42478-4	HPPG-ESU-TU098A-014A	Solid	06/16/21 14:26	06/21/21 09:30
160-42478-5	HPPG-ESU-TU098A-015A	Solid	06/16/21 14:38	06/21/21 09:30
160-42478-6	HPPG-ESU-TU098A-016A	Solid	06/16/21 14:40	06/21/21 09:30
160-42478-7	HPPG-ESU-TU098A-017A	Solid	06/16/21 14:35	06/21/21 09:30
160-42478-8	HPPG-ESU-TU098A-021A	Solid	06/16/21 14:24	06/21/21 09:30
160-42478-9	HPPG-ESU-TU098A-022A	Solid	06/16/21 14:47	06/21/21 09:30
160-42478-10	HPPG-ESU-TU098A-023A	Solid	06/16/21 14:46	06/21/21 09:30
160-42478-11	HPPG-ESU-TU098A-024A	Solid	06/16/21 14:45	06/21/21 09:30
160-42478-12	HPPG-ESU-TU098A-025A	Solid	06/16/21 15:02	06/21/21 09:30
160-42478-13	HPPG-F-002A	Solid	06/16/21 14:45	06/21/21 09:30

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-008A

Lab Sample ID: 160-42478-1

Date Collected: 06/16/21 14:27
Date Received: 06/21/21 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.592		0.201	0.212		0.0383	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Actinium-227	0.104	U	0.190	0.190		0.433	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Americium-241	0.0711	U	0.183	0.183		0.148	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Bismuth-212	0.385	U	0.732	0.733		0.556	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Bismuth-214	0.314		0.131	0.136		0.0603	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Cesium-137	0.0281	U	0.0541	0.0542	0.0700	0.0407	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Lead-210	1.92		1.90	1.91		1.15	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Lead-212	0.413		0.105	0.115		0.0553	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Lead-214	0.416		0.128	0.137		0.0653	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Potassium-40	8.01		1.48	1.74		0.359	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Protactinium-231	0.421	U	1.63	1.64		2.58	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Protactinium-234	0.00575	U	0.0107	0.0107		0.314	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Radium-226	0.314		0.131	0.136	0.200	0.0603	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Radium-228	0.592		0.201	0.212		0.0383	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Thallium-208	0.123		0.0900	0.0911		0.0467	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Thorium 228	0.413		0.105	0.115		0.0553	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Thorium-232	0.592		0.201	0.212		0.0383	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Thorium-234	0.401	U	0.545	0.547		0.536	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Uranium-235	-0.186	U	0.361	0.361		0.624	pCi/g	06/24/21 12:16	07/16/21 18:52	1
Uranium-238	0.401	U	0.545	0.547		0.536	pCi/g	06/24/21 12:16	07/16/21 18:52	1

Client Sample ID: HPPG-ESU-TU098A-012A

Lab Sample ID: 160-42478-2

Date Collected: 06/16/21 14:15
Date Received: 06/21/21 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.344		0.164	0.167		0.111	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Actinium-227	-0.0789	U	0.484	0.484		0.285	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Americium-241	0.0419	U	0.116	0.116		0.0940	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Bismuth-212	0.298	U	0.686	0.687		0.543	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Bismuth-214	0.307		0.112	0.116		0.0470	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Cesium-137	0.0184	U	0.0566	0.0567	0.0700	0.0453	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Lead-210	0.528	U	1.17	1.17		0.938	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Lead-212	0.302		0.0659	0.0766		0.0309	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Lead-214	0.283		0.0765	0.0819		0.0318	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Potassium-40	6.65		1.05	1.25		0.246	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Protactinium-231	0.000	U	0.570	0.570		1.61	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Protactinium-234	0.0353	U	0.134	0.134		0.175	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Radium-226	0.307		0.112	0.116	0.200	0.0470	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Radium-228	0.344		0.164	0.167		0.111	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Thallium-208	0.0798		0.0522	0.0529		0.0255	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Thorium 228	0.302		0.0659	0.0766		0.0309	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Thorium-232	0.344		0.164	0.167		0.111	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Thorium-234	0.275	U	0.934	0.934		0.763	pCi/g	06/24/21 12:16	07/16/21 22:19	1
Uranium-235	0.0782	U	0.148	0.148		0.296	pCi/g	06/24/21 12:16	07/16/21 22:19	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-012A
Date Collected: 06/16/21 14:15
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.275	U	0.934	0.934		0.763	pCi/g	06/24/21 12:16	07/16/21 22:19	1

Client Sample ID: HPPG-ESU-TU098A-013A
Date Collected: 06/16/21 14:30
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-3
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.312		0.185	0.188		0.0805	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Actinium-227	0.0439	U	0.366	0.366		0.216	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Americium-241	-0.0612	U	0.138	0.138		0.112	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Bismuth-212	0.163	U	0.346	0.346		0.262	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Bismuth-214	0.302		0.0894	0.0947		0.0371	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Cesium-137	0.0130	U	0.0283	0.0284	0.0700	0.0215	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Lead-210	-0.200	U	1.16	1.16		0.943	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Lead-212	0.335		0.0659	0.0789		0.0298	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Lead-214	0.306		0.0726	0.0793		0.0316	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Potassium-40	7.75		1.04	1.31		0.0820	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Protactinium-231	0.000	U	0.226	0.226		1.50	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Protactinium-234	0.0872	U	0.165	0.165		0.172	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Radium-226	0.302		0.0894	0.0947	0.200	0.0371	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Radium-228	0.312		0.185	0.188		0.0805	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Thallium-208	0.101		0.0349	0.0365		0.0129	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Thorium 228	0.335		0.0659	0.0789		0.0298	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Thorium-232	0.312		0.185	0.188		0.0805	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Thorium-234	0.194	U	0.405	0.406		0.898	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Uranium-235	0.0928	U	0.163	0.163		0.309	pCi/g	06/24/21 12:16	07/16/21 22:20	1
Uranium-238	0.194	U	0.405	0.406		0.898	pCi/g	06/24/21 12:16	07/16/21 22:20	1

Client Sample ID: HPPG-ESU-TU098A-014A
Date Collected: 06/16/21 14:26
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-4
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.536		0.156	0.165		0.0441	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Actinium-227	0.0501	U	0.202	0.203		0.341	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Americium-241	-0.0378	U	0.136	0.136		0.0928	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Bismuth-212	-0.0453	U	0.937	0.937		0.768	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Bismuth-214	0.464		0.130	0.138		0.0421	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Cesium-137	0.0246	U	0.0491	0.0492	0.0700	0.0373	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Lead-210	1.09		1.14	1.15		0.756	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Lead-212	0.497		0.0955	0.115		0.0421	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Lead-214	0.490		0.120	0.130		0.0620	pCi/g	06/24/21 12:16	07/16/21 22:21	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-014A
Date Collected: 06/16/21 14:26
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-4
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	(2σ+/-)						
Potassium-40	8.02			1.39	1.62	0.279	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Protactinium-231	0.590	U		1.83	1.83	2.00	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Protactinium-234	-0.0265	U		0.0692	0.0692	0.187	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Radium-226	0.464			0.130	0.138	0.200	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Radium-228	0.536			0.156	0.165	0.0441	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Thallium-208	0.220			0.0657	0.0695	0.0208	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Thorium 228	0.497			0.0955	0.115	0.0421	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Thorium-232	0.536			0.156	0.165	0.0441	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Thorium-234	-0.106	U		0.922	0.922	0.761	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Uranium-235	0.0911	U		0.331	0.331	0.268	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Uranium-238	-0.106	U		0.922	0.922	0.761	pCi/g	06/24/21 12:16	07/16/21 22:21	1

Client Sample ID: HPPG-ESU-TU098A-015A

Lab Sample ID: 160-42478-5

Date Collected: 06/16/21 14:38

Matrix: Solid

Date Received: 06/21/21 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac	
			Uncert.	(2σ+/-)							
Actinium 228	0.677			0.237	0.249	0.136	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Actinium-227	-0.385	U		0.735	0.737	0.443	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Americium-241	0.0802	U		0.192	0.192	0.155	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Bismuth-212	-0.0237	U		0.812	0.812	0.667	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Bismuth-214	0.509			0.151	0.162	0.0617	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Cesium-137	0.0430	U		0.0822	0.0823	0.0700	0.0642	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Lead-210	0.277	U		1.59	1.59		1.10	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Lead-212	0.445			0.113	0.125	0.0668	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Lead-214	0.557			0.148	0.162	0.0623	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Potassium-40	7.40			1.36	1.60	0.326	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Protactinium-231	-1.16	U		3.85	3.85	3.14	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Protactinium-234	-0.120	U		0.362	0.362	0.295	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Radium-226	0.509			0.151	0.162	0.200	0.0617	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Radium-228	0.677			0.237	0.249		0.136	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Thallium-208	0.281			0.0908	0.0964	0.0325	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Thorium 228	0.445			0.113	0.125	0.0668	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Thorium-232	0.677			0.237	0.249		0.136	pCi/g	06/24/21 12:16	07/16/21 22:21	1
Thorium-234	-0.939	U		0.812	0.820	0.952	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Uranium-235	-0.229	U		0.430	0.431	0.505	pCi/g	06/24/21 12:16	07/16/21 22:21	1	
Uranium-238	-0.939	U		0.812	0.820	0.952	pCi/g	06/24/21 12:16	07/16/21 22:21	1	

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-016A
Date Collected: 06/16/21 14:40
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-6
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.771		0.214	0.228		0.0349	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Actinium-227	0.298	U	0.573	0.574		0.341	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Americium-241	0.0720	U	0.170	0.170		0.137	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Bismuth-212	0.000	U	0.619	0.619		0.739	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Bismuth-214	0.567		0.172	0.182		0.0745	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Cesium-137	0.0342	U	0.0694	0.0695	0.0700	0.0538	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Lead-210	0.860	U	1.41	1.42		1.09	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Lead-212	0.527		0.110	0.123		0.0527	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Lead-214	0.579		0.125	0.138		0.0610	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Potassium-40	9.03		1.50	1.76		0.324	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Protactinium-231	0.000	U	0.840	0.840		2.67	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Protactinium-234	0.0963	U	0.304	0.304		0.291	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Radium-226	0.567		0.172	0.182	0.200	0.0745	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Radium-228	0.771		0.214	0.228		0.0349	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Thallium-208	0.231		0.0586	0.0631		0.00867	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Thorium 228	0.527		0.110	0.123		0.0527	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Thorium-232	0.771		0.214	0.228		0.0349	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Thorium-234	-1.11	U	1.01	1.02		0.787	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Uranium-235	0.101	U	0.211	0.211		0.496	pCi/g	06/24/21 12:16	07/17/21 05:33	1
Uranium-238	-1.11	U	1.01	1.02		0.787	pCi/g	06/24/21 12:16	07/17/21 05:33	1

Client Sample ID: HPPG-ESU-TU098A-017A

Date Collected: 06/16/21 14:35
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-7

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.732		0.152	0.170		0.0217	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Actinium-227	0.000	U	0.305	0.305		0.293	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Americium-241	0.0362	U	0.151	0.151		0.123	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Bismuth-212	-0.0601	U	0.815	0.815		0.668	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Bismuth-214	0.562		0.110	0.124		0.0355	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Cesium-137	-0.0102	U	0.0487	0.0487	0.0700	0.0392	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Lead-210	0.603	U	1.13	1.14		0.903	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Lead-212	0.647		0.0889	0.122		0.0350	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Lead-214	0.474		0.0879	0.101		0.0401	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Potassium-40	8.41		1.11	1.41		0.0856	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Protactinium-231	0.000	U	0.552	0.552		1.91	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Protactinium-234	0.0920	U	0.131	0.131		0.204	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Radium-226	0.562		0.110	0.124	0.200	0.0355	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Radium-228	0.732		0.152	0.170		0.0217	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thallium-208	0.208		0.0642	0.0677		0.0236	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thorium 228	0.647		0.0889	0.122		0.0350	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thorium-232	0.732		0.152	0.170		0.0217	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thorium-234	-0.361	U	1.06	1.06		0.862	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Uranium-235	-0.155	U	0.419	0.419		0.341	pCi/g	06/24/21 12:16	07/17/21 05:34	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-017A
Date Collected: 06/16/21 14:35
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-7
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	-0.361	U	1.06	1.06		0.862	pCi/g	06/24/21 12:16	07/17/21 05:34	1

Client Sample ID: HPPG-ESU-TU098A-021A
Date Collected: 06/16/21 14:24
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-8
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.437		0.179	0.184		0.107	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Actinium-227	0.176	U	0.496	0.496		0.300	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Americium-241	0.0430	U	0.164	0.164		0.133	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Bismuth-212	0.258	U	0.681	0.682		0.536	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Bismuth-214	0.491		0.131	0.140		0.0441	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Cesium-137	0.0120	U	0.0511	0.0511	0.0700	0.0283	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Lead-210	0.745	U	1.35	1.35		0.890	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Lead-212	0.453		0.0902	0.108		0.0401	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Lead-214	0.416		0.108	0.117		0.0465	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Potassium-40	7.47		1.25	1.47		0.298	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Protactinium-231	-0.765	U	2.75	2.75		2.24	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Protactinium-234	0.0251	U	0.0456	0.0457		0.201	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Radium-226	0.491		0.131	0.140	0.200	0.0441	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Radium-228	0.437		0.179	0.184		0.107	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thallium-208	0.117		0.0506	0.0521		0.0211	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thorium 228	0.453		0.0902	0.108		0.0401	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thorium-232	0.437		0.179	0.184		0.107	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Thorium-234	0.519		0.575	0.578		0.395	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Uranium-235	0.159		0.178	0.178		0.122	pCi/g	06/24/21 12:16	07/17/21 05:34	1
Uranium-238	0.519		0.575	0.578		0.395	pCi/g	06/24/21 12:16	07/17/21 05:34	1

Client Sample ID: HPPG-ESU-TU098A-022A
Date Collected: 06/16/21 14:47
Date Received: 06/21/21 09:30

Lab Sample ID: 160-42478-9
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.463		0.137	0.145		0.0299	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Actinium-227	0.0191	U	0.0517	0.0517		0.333	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Americium-241	0.0664	U	0.136	0.136		0.109	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Bismuth-212	-0.559	U	1.10	1.10		0.870	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Bismuth-214	0.380		0.124	0.130		0.0528	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Cesium-137	0.0180	U	0.0455	0.0455	0.0700	0.0352	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Lead-210	1.08		1.50	1.50		0.981	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Lead-212	0.419		0.0913	0.101		0.0446	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Lead-214	0.390		0.109	0.116		0.0653	pCi/g	06/24/21 12:16	07/17/21 06:05	1

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Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-022A

Lab Sample ID: 160-42478-9

Date Collected: 06/16/21 14:47

Matrix: Solid

Date Received: 06/21/21 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Potassium-40	7.63		1.28	1.49		0.277	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Protactinium-231	0.606	U	1.82	1.82		1.99	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Protactinium-234	0.0160	U	0.0290	0.0291		0.254	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Radium-226	0.380		0.124	0.130	0.200	0.0528	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Radium-228	0.463		0.137	0.145		0.0299	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Thallium-208	0.181		0.0551	0.0581		0.0155	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Thorium 228	0.419		0.0913	0.101		0.0446	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Thorium-232	0.463		0.137	0.145		0.0299	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Thorium-234	-0.256	U	0.938	0.939		0.779	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Uranium-235	-0.0696	U	0.148	0.148		0.486	pCi/g	06/24/21 12:16	07/17/21 06:05	1
Uranium-238	-0.256	U	0.938	0.939		0.779	pCi/g	06/24/21 12:16	07/17/21 06:05	1

Client Sample ID: HPPG-ESU-TU098A-023A

Lab Sample ID: 160-42478-10

Date Collected: 06/16/21 14:46

Matrix: Solid

Date Received: 06/21/21 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.441		0.166	0.172		0.0887	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Actinium-227	0.147	U	0.359	0.359		0.344	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Americium-241	0.0484	U	0.170	0.170		0.138	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Bismuth-212	0.457	U	0.851	0.852		0.664	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Bismuth-214	0.295		0.114	0.118		0.0531	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Cesium-137	0.0282	U	0.0564	0.0565	0.0700	0.0436	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Lead-210	-0.661	U	1.53	1.53		1.29	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Lead-212	0.404		0.0885	0.103		0.0352	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Lead-214	0.482		0.113	0.124		0.0512	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Potassium-40	7.61		1.27	1.49		0.303	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Protactinium-231	0.684	U	2.15	2.15		1.74	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Protactinium-234	-0.0930	U	0.296	0.296		0.241	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Radium-226	0.295		0.114	0.118	0.200	0.0531	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Radium-228	0.441		0.166	0.172		0.0887	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thallium-208	0.148		0.0602	0.0621		0.0265	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thorium 228	0.404		0.0885	0.103		0.0352	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thorium-232	0.441		0.166	0.172		0.0887	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thorium-234	0.330	U	0.495	0.496		0.417	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Uranium-235	-0.0404	U	0.503	0.503		0.245	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Uranium-238	0.330	U	0.495	0.496		0.417	pCi/g	06/24/21 12:16	07/17/21 06:07	1

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Client Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42478-1
 SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-024A
Lab Sample ID: 160-42478-11

 Date Collected: 06/16/21 14:45
 Date Received: 06/21/21 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.415		0.321	0.325		0.149	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Actinium-227	0.110	U	0.376	0.376		0.370	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Americium-241	0.102		0.104	0.105		0.0659	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Bismuth-212	0.407	U	0.761	0.762		0.579	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Bismuth-214	0.484		0.153	0.163		0.0581	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Cesium-137	-0.0582	U	0.0891	0.0894	0.0700	0.0873	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Lead-210	0.873	U	1.71	1.72		1.13	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Lead-212	0.455		0.110	0.122		0.0587	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Lead-214	0.588		0.131	0.147		0.0593	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Potassium-40	8.87		1.55	1.86		0.358	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Protactinium-231	0.393	U	1.64	1.64		2.55	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Protactinium-234	-0.0471	U	0.110	0.111		0.334	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Radium-226	0.484		0.153	0.163	0.200	0.0581	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Radium-228	0.415		0.321	0.325		0.149	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thallium-208	0.0431	U	0.116	0.116		0.0572	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thorium 228	0.455		0.110	0.122		0.0587	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thorium-232	0.415		0.321	0.325		0.149	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Thorium-234	-1.03	U	1.00	1.01		1.04	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Uranium-235	0.289	U	0.432	0.433		0.567	pCi/g	06/24/21 12:16	07/17/21 06:07	1
Uranium-238	-1.03	U	1.00	1.01		1.04	pCi/g	06/24/21 12:16	07/17/21 06:07	1

Client Sample ID: HPPG-ESU-TU098A-025A
Lab Sample ID: 160-42478-12

 Date Collected: 06/16/21 15:02
 Date Received: 06/21/21 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.557		0.220	0.229		0.0727	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Actinium-227	-0.410	U	0.782	0.784		0.471	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Americium-241	-0.0191	U	0.192	0.192		0.158	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Bismuth-212	0.372	U	0.730	0.731		0.557	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Bismuth-214	0.533		0.157	0.169		0.0546	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Cesium-137	-0.0240	U	0.0452	0.0453	0.0700	0.0572	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Lead-210	-1.56	U	2.24	2.25		1.90	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Lead-212	0.422		0.102	0.113		0.0522	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Lead-214	0.550		0.119	0.135		0.0498	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Potassium-40	8.23		1.48	1.75		0.347	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Protactinium-231	0.579	U	2.10	2.10		2.29	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Protactinium-234	-0.0252	U	0.0659	0.0660		0.317	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Radium-226	0.533		0.157	0.169	0.200	0.0546	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Radium-228	0.557		0.220	0.229		0.0727	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Thallium-208	0.177		0.0718	0.0747		0.0316	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Thorium 228	0.422		0.102	0.113		0.0522	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Thorium-232	0.557		0.220	0.229		0.0727	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Thorium-234	0.672		0.524	0.531		0.403	pCi/g	06/24/21 12:16	07/17/21 05:35	1
Uranium-235	0.247	U	0.502	0.503		0.534	pCi/g	06/24/21 12:16	07/17/21 05:35	1

Eurofins TestAmerica, St. Louis

Client Sample Results

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Client Sample ID: HPPG-ESU-TU098A-025A

Lab Sample ID: 160-42478-12

Date Collected: 06/16/21 15:02

Matrix: Solid

Date Received: 06/21/21 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Uranium-238	0.672		0.524	0.531		0.403	pCi/g	06/24/21 12:16	07/17/21 05:35	1

Client Sample ID: HPPG-F-002A

Lab Sample ID: 160-42478-13

Date Collected: 06/16/21 14:45

Matrix: Solid

Date Received: 06/21/21 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.465		0.143	0.151		0.0505	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Actinium-227	0.217	U	0.358	0.359		0.269	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Americium-241	0.0564	U	0.129	0.129		0.104	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Bismuth-212	0.0313	U	0.598	0.598		0.490	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Bismuth-214	0.406		0.113	0.121		0.0442	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Cesium-137	-0.0263	U	0.0610	0.0611	0.0700	0.0484	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Lead-210	-0.668	U	1.48	1.48		1.19	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Lead-212	0.423		0.0743	0.0923		0.0301	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Lead-214	0.425		0.0890	0.0994		0.0329	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Potassium-40	7.44		1.11	1.35		0.250	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Protactinium-231	0.000	U	0.478	0.478		1.81	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Protactinium-234	0.0490	U	0.140	0.141		0.161	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Radium-226	0.406		0.113	0.121	0.200	0.0442	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Radium-228	0.465		0.143	0.151		0.0505	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Thallium-208	0.192		0.0444	0.0487		0.00989	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Thorium 228	0.423		0.0743	0.0923		0.0301	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Thorium-232	0.465		0.143	0.151		0.0505	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Thorium-234	0.0192	U	0.0402	0.0403		0.921	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Uranium-235	0.000	U	0.117	0.117		0.316	pCi/g	06/24/21 10:13	07/16/21 05:48	1
Uranium-238	0.0192	U	0.0402	0.0403		0.921	pCi/g	06/24/21 10:13	07/16/21 05:48	1

Eurofins TestAmerica, St. Louis

QC Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42478-1
 SDG: GJ46599757

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-515867/1-A

Matrix: Solid

Analysis Batch: 518909

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515867

Analyte	Result	MB	MB	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	-0.1505	U		0.261	0.262		0.131	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Actinium-227	0.06326	U		0.140	0.141		0.236	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Americium-241	-0.04711	U		0.110	0.110		0.0877	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Bismuth-212	0.2256	U		0.393	0.394		0.283	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Bismuth-214	-0.05108	U		0.146	0.146		0.119	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Cesium-137	0.02285	U		0.0469	0.0470	0.0700	0.0358	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Lead-210	-0.1570	U		0.873	0.874		0.705	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Lead-212	-0.02043	U		0.0987	0.0987		0.0802	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Lead-214	-0.009401	U		0.0499	0.0499		0.0413	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Potassium-40	-0.09006	U		0.379	0.379		0.323	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Protactinium-231	0.0000	U		0.552	0.552		1.59	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Protactinium-234	0.09974			0.135	0.135		0.0677	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Radium-226	-0.05108	U		0.146	0.146	0.200	0.119	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Radium-228	-0.1505	U		0.261	0.262		0.131	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Thallium-208	0.05644			0.0517	0.0521		0.0201	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Thorium 228	-0.02043	U		0.0987	0.0987		0.0802	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Thorium-232	-0.1505	U		0.261	0.262		0.131	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Thorium-234	0.0000	U		0.0716	0.0716		0.463	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Uranium-235	0.05006	U		0.231	0.231		0.187	pCi/g	06/24/21 10:13	07/16/21 06:29	1
Uranium-238	0.0000	U		0.0716	0.0716		0.463	pCi/g	06/24/21 10:13	07/16/21 06:29	1

Lab Sample ID: LCS 160-515867/2-A

Matrix: Solid

Analysis Batch: 518903

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 515867

Analyte	Spike Added	Spike	LCS	LCS	Total	LOQ	DLC	Unit	%Rec	Limits
		Result	Qual	Uncert. (2σ+/-)						
Americium-241	96.3	98.13		10.3		0.440	pCi/g	102	87 - 116	
Cesium-137	26.4	25.45		2.71	0.0700	0.0747	pCi/g	97	87 - 120	
Cobalt-60	8.76	8.158		0.862		0.0416	pCi/g	93	87 - 115	

Lab Sample ID: MB 160-515890/1-A

Matrix: Solid

Analysis Batch: 518903

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 515890

Analyte	MB	MB	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac	
			Result	Qualifier	(2σ+/-)	(2σ+/-)					
Actinium 228	0.03156	U	0.0934		0.0935		0.0625	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Actinium-227	-0.005764	U	0.0119		0.0119		0.304	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Americium-241	0.03314	U	0.0758		0.0759		0.0597	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Bismuth-212	0.2841	U	0.583		0.584		0.448	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Bismuth-214	0.03023	U	0.0229		0.0231		0.129	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Cesium-137	0.008523	U	0.0418		0.0418	0.0700	0.0333	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Lead-210	0.2243	U	0.766		0.767		0.609	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Lead-212	-0.01223	U	0.0190		0.0190		0.0650	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Lead-214	0.02442	U	0.0232		0.0233		0.0584	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Potassium-40	0.1420	U	0.583		0.584		0.270	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Protactinium-231	0.1436	U	0.885		0.885		1.37	pCi/g	06/24/21 12:16	07/16/21 18:10	1

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QC Sample Results

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 Client: Aptim Federal Services LLC
 Project/Site: HPNS-Parcel G 501197

 Job ID: 160-42478-1
 SDG: GJ46599757

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-515890/1-A

Client Sample ID: Method Blank

Matrix: Solid

Analysis Batch: 518903

Prep Type: Total/NA

Prep Batch: 515890

Analyte	Result	MB	MB	Count		Total		DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert.	(2σ+/-)	Uncert.	(2σ+/-)					
Protactinium-234	-0.008096	U		0.0284		0.0284		0.134	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Radium-226	0.03023	U		0.0229		0.0231	0.200	0.129	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Radium-228	0.03156	U		0.0934		0.0935		0.0625	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Thallium-208	0.02972			0.0542		0.0543		0.0193	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Thorium 228	-0.01223	U		0.0190		0.0190		0.0650	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Thorium-232	0.03156	U		0.0934		0.0935		0.0625	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Thorium-234	0.0000	U		0.0848		0.0848		0.500	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Uranium-235	0.06719	U		0.137		0.137		0.235	pCi/g	06/24/21 12:16	07/16/21 18:10	1
Uranium-238	0.0000	U		0.0848		0.0848		0.500	pCi/g	06/24/21 12:16	07/16/21 18:10	1

Lab Sample ID: LCS 160-515890/2-A

Client Sample ID: Lab Control Sample

Matrix: Solid

Analysis Batch: 518909

Prep Type: Total/NA

Prep Batch: 515890

Analyte	Spike Added	LCS Result	LCS Qual	Total		LOQ	DLC	Unit	%Rec.	Limits
				Uncert.	(2σ+/-)					
Americium-241	96.3	94.50		9.92			0.520	pCi/g	98	87 - 116
Cesium-137	26.4	25.86		2.75		0.0700	0.0579	pCi/g	98	87 - 120
Cobalt-60	8.76	8.443		0.889			0.0259	pCi/g	96	87 - 115

Lab Sample ID: 160-42478-12 DU

Client Sample ID: HPPG-ESU-TU098A-025A

Matrix: Solid

Analysis Batch: 519056

Prep Type: Total/NA

Prep Batch: 515890

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total		LOQ	DLC	Unit	RER	Limit
					Uncert.	(2σ+/-)					
Actinium 228	0.557		0.4789		0.129			0.0210	pCi/g	0.22	1
Actinium-227	-0.410	U	0.2159	U	0.418			0.239	pCi/g	0.52	1
Americium-241	-0.0191	U	-0.03126	U	0.136			0.111	pCi/g	0.04	1
Bismuth-212	0.372	U	0.3037	U	0.589			0.459	pCi/g	0.05	1
Bismuth-214	0.533		0.4339		0.108			0.0340	pCi/g	0.36	1
Cesium-137	-0.0240	U	0.001603	U	0.0377	0.0700		0.0309	pCi/g	0.31	1
Lead-210	-1.56	U	-0.1181	U	1.13			0.922	pCi/g	0.43	1
Lead-212	0.422		0.4959		0.0986			0.0270	pCi/g	0.35	1
Lead-214	0.550		0.3826		0.0803			0.0269	pCi/g	0.78	1
Potassium-40	8.23		7.476		1.28			0.0829	pCi/g	0.25	1
Protactinium-231	0.579	U	0.0000	U	0.523			1.55	pCi/g	0.22	1
Protactinium-234	-0.0252	U	0.07685	U	0.217			0.176	pCi/g	0.36	1
Radium-226	0.533		0.4339		0.108	0.200		0.0340	pCi/g	0.36	1
Radium-228	0.557		0.4789		0.129			0.0210	pCi/g	0.22	1
Thallium-208	0.177		0.1629		0.0472			0.0137	pCi/g	0.12	1
Thorium 228	0.422		0.4959		0.0986			0.0270	pCi/g	0.35	1
Thorium-232	0.557		0.4789		0.129			0.0210	pCi/g	0.22	1
Thorium-234	0.672		0.4108		0.426			0.302	pCi/g	0.27	1
Uranium-235	0.247	U	0.08346	U	0.148			0.318	pCi/g	0.25	1
Uranium-238	0.672		0.4108		0.426			0.302	pCi/g	0.27	1

Eurofins TestAmerica, St. Louis

QC Association Summary

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Client: Aptim Federal Services LLC
Project/Site: HPNS-Parcel G 501197

Job ID: 160-42478-1
SDG: GJ46599757

Rad

Leach Batch: 515426

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42478-1	HPPG-ESU-TU098A-008A	Total/NA	Solid	Dry and Grind	
160-42478-2	HPPG-ESU-TU098A-012A	Total/NA	Solid	Dry and Grind	
160-42478-3	HPPG-ESU-TU098A-013A	Total/NA	Solid	Dry and Grind	
160-42478-4	HPPG-ESU-TU098A-014A	Total/NA	Solid	Dry and Grind	
160-42478-5	HPPG-ESU-TU098A-015A	Total/NA	Solid	Dry and Grind	
160-42478-6	HPPG-ESU-TU098A-016A	Total/NA	Solid	Dry and Grind	
160-42478-7	HPPG-ESU-TU098A-017A	Total/NA	Solid	Dry and Grind	
160-42478-8	HPPG-ESU-TU098A-021A	Total/NA	Solid	Dry and Grind	
160-42478-9	HPPG-ESU-TU098A-022A	Total/NA	Solid	Dry and Grind	
160-42478-10	HPPG-ESU-TU098A-023A	Total/NA	Solid	Dry and Grind	
160-42478-11	HPPG-ESU-TU098A-024A	Total/NA	Solid	Dry and Grind	
160-42478-12	HPPG-ESU-TU098A-025A	Total/NA	Solid	Dry and Grind	
160-42478-12 DU	HPPG-F-002A	Total/NA	Solid	Dry and Grind	
	HPPG-ESU-TU098A-025A	Total/NA	Solid	Dry and Grind	

Prep Batch: 515867

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42478-13	HPPG-F-002A	Total/NA	Solid	Fill_Geo-21	515426
MB 160-515867/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-515867/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 515890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-42478-1	HPPG-ESU-TU098A-008A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-2	HPPG-ESU-TU098A-012A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-3	HPPG-ESU-TU098A-013A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-4	HPPG-ESU-TU098A-014A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-5	HPPG-ESU-TU098A-015A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-6	HPPG-ESU-TU098A-016A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-7	HPPG-ESU-TU098A-017A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-8	HPPG-ESU-TU098A-021A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-9	HPPG-ESU-TU098A-022A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-10	HPPG-ESU-TU098A-023A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-11	HPPG-ESU-TU098A-024A	Total/NA	Solid	Fill_Geo-21	515426
160-42478-12	HPPG-ESU-TU098A-025A	Total/NA	Solid	Fill_Geo-21	515426
MB 160-515890/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-515890/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-42478-12 DU	HPPG-ESU-TU098A-025A	Total/NA	Solid	Fill_Geo-21	515426

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